A Dissertation on

"COMPARISON BETWEEN CONTINUOUS FEMORAL 3 IN 1 NERVE BLOCK WITH CONTINUOUS EPIDURAL ANALGESIA FOR POST OPERATIVE PAIN RELIEF IN FRACTURE NECK OF FEMUR"

Submitted to

THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY

In partial fulfillment of the requirement
For the award of degree of

M.D. BRANCH X
(ANAESTHESIOLOGY)

DEPARTMENT OF ANAESTHESIOLOGY
STANLEY MEDICAL COLLEGE
THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY
CHENNAI

MARCH 2010

CERTIFICATE

This is to certify that this dissertation entiled "**COMPARISON BETWEEN CONTINUOUS FEMORAL 3 IN 1 NERVE BLOCK WITH CONTINUOUS EPIDURAL ANALGESIA FOR POST OPERATIVE PAIN RELIEF IN FRACTURE NECK OF FEMUR**", is a bonafide Original work of Dr.T. Nirmalraj in partial fulfillment of the requirement for M.D Anaesthesiolgy Examination of The Tamilnadu Dr.M.G.R. Medical University in March 2010.

Dean,
Govt. Stanley Medical College,
Chennai – 1

Professor and Head of the Department,
Dept of Anaesthesiology,
Govt. Stanley Medical College,
Chennai - 1

DECLARATION

I, Dr. T. NIRMALRAJ, Solemnly declare that the dissertation, titled "**COMPARISON BETWEEN CONTINUOUS FEMORAL 3 IN 1 NERVE BLOCK WITH CONTINUOUS EPIDURAL ANALGESIA FOR POST OPERATIVE PAIN RELIEF IN FRACTURE NECK OF FEMUR**", is a bonafide work done by me at Government Stanley Medical College during the period June 2009 to July 2009 under the expert guidance and supervision of Dr. Subramania Bharathiyar M.D; D.A., Professor and Head of the Department, Department of Anaesthesiology, Government Stanley Medical College, Chennai -1.

This dissertation is submitted to The Tamilnadu Dr. M.G. R. Medical University in partial fulfillment of requirement for the award of M.D. Degree Anaesthesiology.

Chennai:
Date :

Dr.T. NIRMALRAJ

ACKNOWLEDGEMENT

I wish to express my sincere thanks to **PROF.DR.S.CHITHRA M.D.**, Dean, Govt. Stanley Medical College and Hospital for having kindly permitted me to utilize the facilities of the hospital for the conduct of the study.

My heartfelt thanks to **PROF. DR. SUBRAMANIYA BHARATHIYAR, M.D. D.A., Prof.& HOD,** Department of Anaesthesiology, Govt. Stanley Medical College and Hospital for his motivation, valuable suggestions, constant supervision and for providing all necessary arrangements for conducting the study.

I am greatly indebted to **Prof. Dr. P.CHANDRASEKAR M.D.,D.A.,** for his valuable suggestions, **Prof Dr. R.MADAN KUMAR M.D.,D.A.,** Member of Ethical Committee for having helped in the approval of the study, **Prof Dr.R.LAKSHMI M.D.,D.A.,** and **Prof Dr. PONNABALA NAMASIVAYAM M.D.,D.A., D.N.B**, for their valuable suggestions. I also thank **Prof. Dr.B.KALA M.D., D.A., Prof**.**Dr.S.GUNASEKARAN M.D., D.A.,D.N.B**, for their guidance earlier in the study.

I owe a lot to My Assistant Professors **Dr.BHASKAR M.D.** and **Dr.RAJASEKAR M.D., D.A., DR. SARAVANA KUMAR M.D., D.N.B.,** who were guiding me throughout the study and supervising periodically.

I thank **ALL ASSISTANT PROFESSORS** who evinced keen interest and gave support without which this study would not have been possible.

I thank **Mr. PADMANABHAN,** Statistician, for helping me in the statistical analysis.

I thank all the post-graduates for their valuable support during the study period.

I thank all the theatre personnel for their co-operation.

I thank all the patients, without whose participation this study would not have been possible.

CONTENTS

INTRODUCTION

Peripheral nerve block, in which local Anaesthetic is injected into a peripheral nerve, may provide superior pain relief when used as part of a balanced analgesia

Femoral nerve block is a basic nerve block technique that is easy to master, carries a low risk of complications and has a significant clinical applicability for surgical anesthesia and postoperative pain management[1].

This block is well suited for postoperative pain management after femur and knee surgery& surgical anesthesia of quadriceps muscle biopsy, knee arthroscopy, quadriceps tendon repair[1].

When combined with the block of the sciatic nerve, anesthesia of the almost entire lower extremity from the mid-thigh level can be achieved.

The success rate of this block for surgery is very high, nearing 95%, as long as the scope of surgery does not extend beyond the area of coverage of the femoral nerve.

By placing a catheter into the femoral nerve sheath continuous 3-in-1 nerve block is achieved. In addition to femoral nerve obturator nerve and lateral cutaneous nerve of the thigh are also blocked[1].

AIM

A CONTROLLED STUDY TO COMPARE THE EFFICACY AND THE INCIDENCE OF COMPLICATIONS BETWEEN CONTINUOUS FEMORAL 3 IN 1 NERVE BLOCK AND CONTINUOUS EPIDURAL ANALGESIA FOR POST-OPERATIVE PAIN RELIEF IN FRACTURE NECK OF FEMUR.

REGIONAL ANESTHESIA ANATOMY

FEMORAL NERVE

The largest branch of the lumbar plexus, arises from the ventral divisions of the second, third, and fourth lumbar nerves. It descends through the fibers of the Psoas major, emerging from the muscle at the lower part of its lateral border, and passes down between it and the Iliacus, behind the iliac fascia; it then runs beneath the inguinal ligament, into the thigh, and splits into an anterior and a posterior division[3].

ANTERIOR DIVISION

Cutaneous Branches:

1) Intermediate cutaneous nerve
2) Medial cutaneous nerve.

Muscular Branches (rami musculares)

1) The nerve to the Pectineus
2) The nerve to the Sartorius

POSTERIOR DIVISION

Cutaneous Branches

1) The saphenous nerve-largest cutaneous branch of the femoral nerve[3].

Muscular Branches

1) Nerve to the Rectus femoris enters the upper part of the deep surface of the muscle, and also supplies a filament to the hip-joint.

2) The branch to the Vastus lateralis, it gives off an articular filament to the knee-joint.

3) The branch to the Vastus medialis. It gives off a filament, which can usually be traced downward, on the surface of the muscle, to the knee-joint.

4) The branches to the Vastus intermedius. A filament from one of these descends through the muscle to the Articularis genu and the knee-joint.

NERVE SUPPLY OF THE HIP JOINT[4]

The nerve supply to the hip joint is through the femoral nerve and is supplied by the following nerves

(a) The nerve to rectus femoris

(b) The anterior division of the obturator nerve (l2, l3, l4)

(c) The accessory obturator nerve (L3, L4), a small branch from the sciatic nerve also supplies the posterior part of the joint through the nerve to quadratus femoris (L4, L5, S1).

Anatomy of the Epidural Space

(i) It is a potential space that lies between the dura and the periosteum lining the inside of the vertebral canal.

(ii) It extends from the foramen magnum to the sacral hiatus.

(iii) The anterior and posterior nerve roots in their dural covering pass across this potential space to unite in the intervertebral foramen to form segmental nerves.

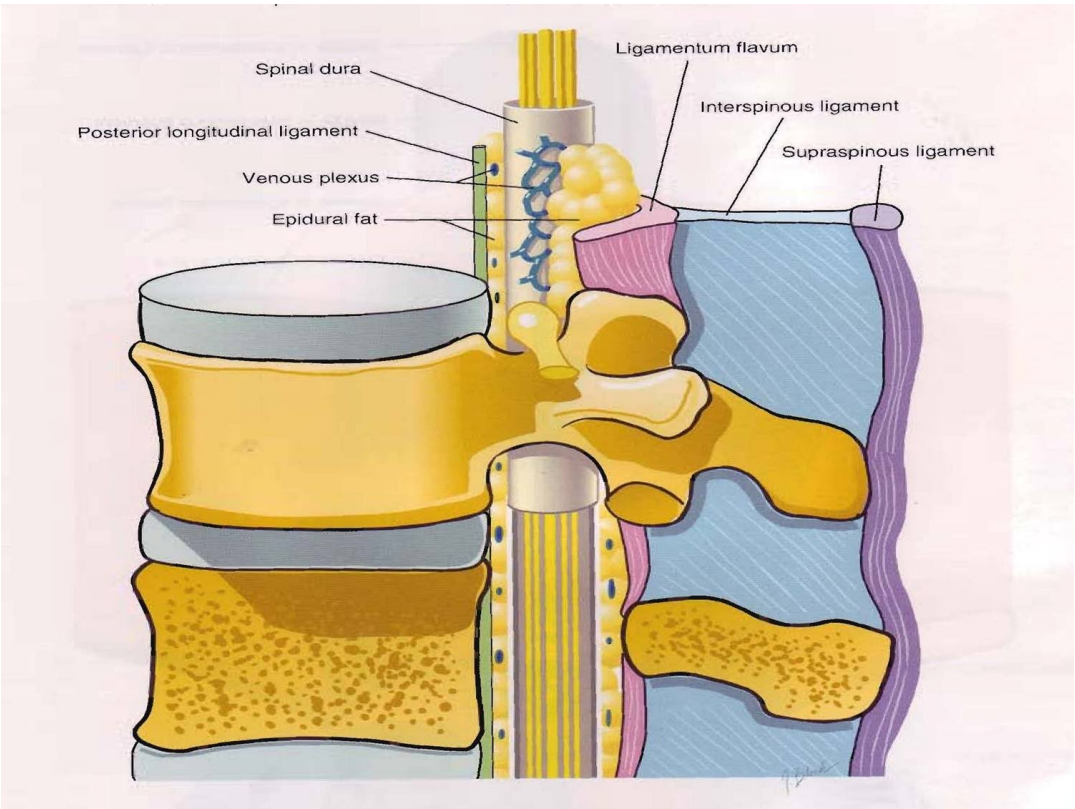
(iv) The anterior border consists of the posterior longitudinal ligament covering the vertebral bodies and the intervertebral discs.

(v) Laterally, the epidural space is bordered by the periosteum of the vertebral

pedicles and the intervertebral foraminae.

(vi) Posteriorly, the bordering structures are the periosteum of the anterior surface of the laminae and articular processes and their connecting ligaments, the periosteum of the root of the spines, and the interlaminar spaces filled by the ligamentum flavum.

(vii) The space contains venous plexuses and fatty tissue, which is continuous with the fat in the paravertebral space.



Epidural Space

CONTINUOUS FEMORAL 3 IN 1 NERVE BLOCK

1. POSITION

The patient is in the supine position with both legs extended[5].

In obese patients, a pillow placed underneath patient's hips

2. PREMEDICATION

Midazolam and Fentanyl may be given

Deeper sedation is neither recommended nor necessary for this block.

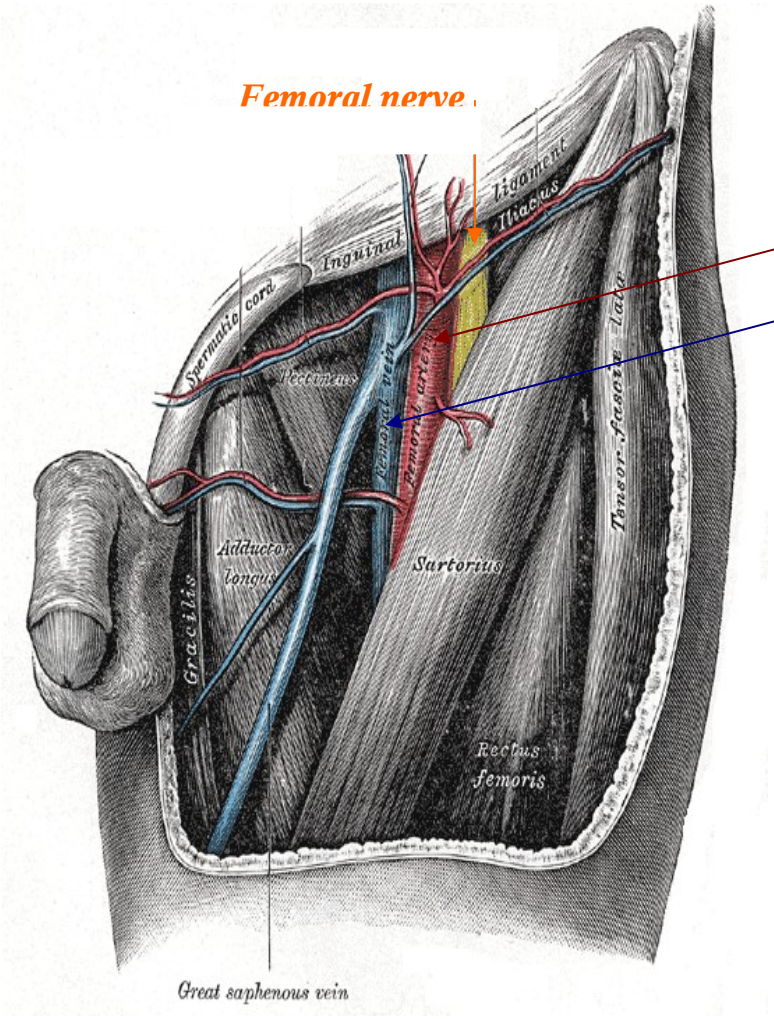
3. LANDMARKS

Based on the relationships in the Femoral Triangle.

(a) Surface Landmarks

(i) Inguinal crease

(ii) Femoral artery



(b) Anatomic Landmarks

(i) Inguinal crease

(ii) Femoral artery pulse

(iii) Needle insertion site is labeled immediately lateral to the pulse of the femoral artery.

4. TECHNIQUE

* Cleaning with an antiseptic solution,

* Local anesthetic is infiltrated subcutaneously at the estimated site of needle insertion. The injection for the skin anesthesia should be shallow and in a line extending laterally to allow for more lateral needle reinsertion when necessary

* The anesthesiologist is standing on the side of the patient with the palpating hand on the femoral artery.

* The needle is introduced immediately at the lateral border of the artery and advanced in the saggital and slightly cephalad plane

Technique Details Specific to Continuous Block Technique[5, 1]

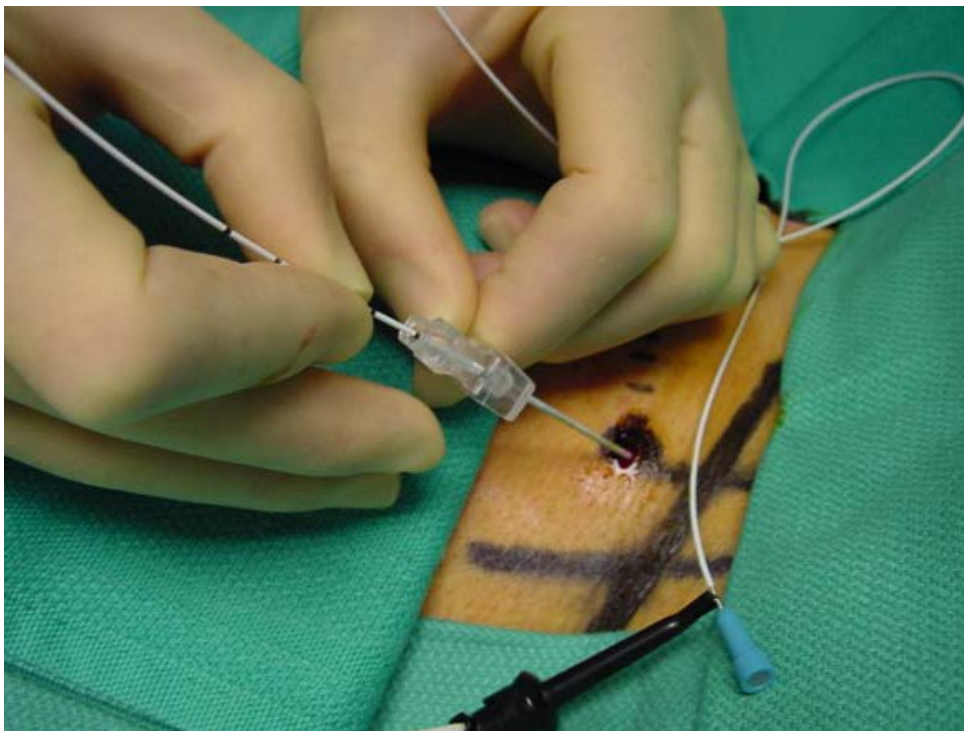
Insertion of the needle at a slightly more acute angle is necessary to facilitate threading of the catheter.

A 5 cm needle connected to the nerve stimulator (1.0 mA, 2 Hz, 100µsec) is inserted and advanced at a 45-60º cephalad.

Care should be taken to avoid medial insertion of the needle and the consequent puncture of the femoral artery.

After the quadriceps muscle twitch is obtained (patella twitch) at 0.5 mA, the initial bolus of local anesthetic is injected (15-20ML)

The catheter is inserted 5-10 cm beyond the tip of the needle. The catheter is then secured to the skin using a clear dressing



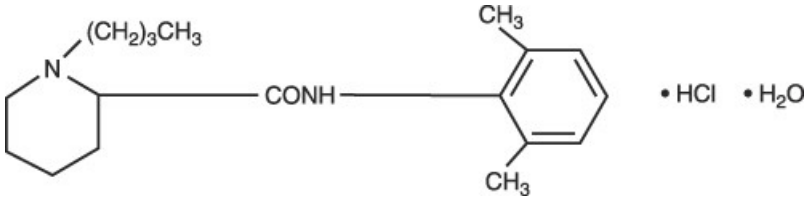
Continuous Infusion

* Diluted bupivacaine or l-bupivacaine (0.25%) are suitable, but may result in more motor blockade
* The infusion is maintained at 8 ml/hr or 5 ml/hr when a PCA dose is planned (5 ml)

PHARMACOLOGY OF BUPIVACAINE

STRUCTURE

Bupivacaine Hydrochloride is 2-Piperidinecarboxamide, 1-butyl-N-(2, 6-dimethylphenyl)-, monohydrochloride, monohydrate[2].



Bupivacaine Hydrochloride Injection is available in sterile, isotonic solutions containing Bupivacaine hydrochloride in water for injection. It is an amide type of local anesthetic

Bupivacaine Hydrochloride Injection

Concentration	Bupivacaine Hydrochloride mg/mL	Sodium Chloride mg/mL
0.25%	2.5	8.6
0.50%	5	8.1
0.75%	7.5	7.6

May contain sodium hydroxide or hydrochloric acid for pH adjustment. Multiple-dose vials contain methylparaben 1 mg/mL added as a preservative.

* Single-dose solutions contain no added bacteriostat or anti-microbial agent and

unused portions should be discarded after use.

BUPIVACAINE - CLINICAL PHARMACOLOGY[6]

* Local anesthetics acts by blocking the generation and the conduction of nerve impulses.
    (i) by increasing the threshold for electrical excitation in the nerve
    (ii) by slowing the propagation of the nerve impulse
    (iii) by reducing the rate of rise of the action potential

* The progression of anesthesia is related to
    (i) The diameter, myelination of nerve fibres
    (ii) Conduction velocity of affected nerve fibers.

ADVERSE EFFECTS[6]

1) CVS

Depress cardiac conduction and excitability - which may lead to atrioventricular block, ventricular arrhythmias, and cardiac arrest

In addition, myocardial contractility is depressed and peripheral vasodilatation occurs, leading to decreased cardiac output and arterial blood pressure.

2) CNS –

Central nervous system stimulation and depression are produced.

Apparent central stimulation is manifested as restlessness, tremors and shivering progressing to convulsions, followed by depression and coma progressing ultimately to respiratory arrest.

A primary depressant effect may occur on the medulla and on higher centers. This depressed stage may occur without a prior excited state.

The rate of systemic absorption of local anesthetics is dependent

* Upon the total dose injected
* Concentration of drug administered,

* The route of administration, the vascularity of the administration site,

The action of Bupivacaine Hydrochloride is long lasting. It has also been noted that there is a period of analgesia that persists after the return of sensation, during which the need for strong analgesics is reduced.

DISTRIBUTION

Pharmacokinetic studies on the plasma profile of Bupivacaine Hydrochloride after direct intravenous injection suggest a three-compartment open model.

* The first compartment is represented by the rapid intravascular distribution of the drug.
* The second compartment represents the equilibration of the drug throughout the highly perfused organs such as the brain, myocardium, lungs, kidneys, and liver.
* The third compartment represents an equilibration of the drug with poorly perfused tissues, such as muscle and fat.

ELIMINATION

(i) After administration in man, peak levels of Bupivacaine in the blood are reached in 30 to 45 minutes, followed by a decline to insignificant levels during the next three to six hours.

(ii) The half-life of Bupivacaine Hydrochloride in adults is 2.7 hours and in neonates

8.1 hours.

(iii) In clinical studies, elderly patients reached the maximal spread of analgesia and maximal motor blockade more rapidly than younger patients. Elderly patients also exhibited higher peak plasma concentrations following administration of this BUPIVACAINE. The total plasma clearance was decreased in these patients.

(iv) Bupivacaine Hydrochloride is metabolized primarily in the liver via conjugation with glucuronic acid. Patients with severe hepatic disease may be more susceptible to the potential toxicities of the amide-type local anesthetics. Pipecoloxylidine is the major metabolite of Bupivacaine Hydrochloride.

(v) The metabolites are excreted primarily in the urine. Only 6% of Bupivacaine is excreted unchanged in the urine.

EPIDURAL ANESTHESIA[5]

INTRODUCTION

The epidural space was first described by Corning in 1901

Fidel Pages first used epidural anaesthesia in humans in 1921.

In 1945 Tuohy introduced the needle which is used for epidural anaesthesia.

INDICATIONS

(i) Sole anaesthetic for procedures involving the lower limbs, pelvis, perineum and lower abdomen.

(ii) It is possible to perform upper abdominal and thoracic procedures under epidural anaesthesia alone.

(iii) Postoperative analgesia

CONTRAINDICATIONS

Absolute

* Patient refusal
* Coagulopathy
* Therapeutic anticoagulation
* Skin infection at injection site.
* Raised intracranial pressure.

Relative

* Uncooperative patients
* Pre-existing neurological disorders, such as multiple sclerosis. Maybe a contraindication, because any new neurological symptoms may be ascribed to the

Epidural.

* Fixed cardiac output states. This includes aortic stenosis. Hypertrophic obstructive cardiomyopathy (HOCM), Mitral stenosis and complete heart block.
* Anatomical abnormalities of vertebral column may make the placement of an epidural technically impossible.
* Prophylactic low dose heparin

TECHNIQUE OF EPIDURAL ANAESTHESIA

Preparation

1. An epidural must be performed in a work area that is equipped for airway management and resuscitation.
2. Facilities for monitoring.
3. Obtain informed consent.
4. Pre-anaesthetic assessment
5. The back should be draped in a sterile fashion, and the operator should take full sterile precautions.

Equipment

1. The epidural needle is typically 16-18G, 8cm long with surface markings at 1cm intervals, and has a blunt bevel with a 15-30 degree curve at the tip is called the

Tuohy needle, and the tip is referred to as the Huber tip.

2. Traditionally, a glass syringe with a plunger, which slides very easily, has been used to identify the epidural space.

3. But currently most practitioners use a plastic syringe to identify a loss of resistance when pressure is applied to the plunger. Some use saline in the syringe, and others use air.

Midline approach

Using local anaesthetic raise a subcutaneous wheal at the midpoint between two adjacent vertebrae

* Insert epidural needle into the skin at this point, and advance through the supraspinous ligament, with the needle pointing in a slightly cephalad direction, advance the needle into the interspinous ligament, which is encountered at a depth of 2-3 cm.

* With 5-10ml of air in the syringe, attach it to the hub of the needle once it has entered the interspinous ligament. Grip both wings of the needle between the thumb and forefinger of both hands. The plunger is gently pressed, and if there is resistance ("bounce"), the needle is very carefully advanced, with the dorsum of both hands resting against the back to provide stability. After 2-3mm, the plunger is again gently pressed, and this procedure is repeated as the needle is carefully

advanced through the tissues. The distinctive increase in resistance when the needle enters the ligamentum flavum is felt, and the process is continued in 2mm increments. There is usually a distinctive "click" when the needle enters the epidural space, at this point air can be injected into the epidural space very easily. Remove the syringe and thread the catheter gently via the needle into the epidural space. The catheter has markings showing the distance from its tip, and should be advanced to 15-18cm at the hub of the needle, to ensure that a sufficient length of catheter has entered the epidural space.

* Remove the needle carefully, ensuring that the catheter is not drawn back with it. The markings on the needle will show the depth of the needle from the skin to the epidural space, and this distance will help to determine the depth to which the catheter should be inserted at the skin

* The catheter fixed under sterile plasters.

The order of nerve fiber block:

1. Sympathetic – Vasomotor fiber
2. Cold sensation – Feeling of warmth
3. Temperature in discrimination
4. Slow pain
5. Fast pain
6. Tactile sense
7. Motor paralysis
8. Pressure sense
9. Proprioception

Factors Affecting Epidural Anaesthesia

1. Site of injection
2. Dosage
3. Age, height & weight
4. Posture
5. Gravity
6. Vasoconstrictors
7. Alkalinisation of local anaesthetics

Physiological Effects of Epidural Blockade

* **Cardiovascular system**. Hypotension, Bradycardia Cardiac arrest

* **Respiratory system.** Unaffected, unless blockade is high enough to affect intercostal muscle nerve supply

* **Gastrointestinal system -** predominance of parasympathetic (vagus and sacral parasympathetic outflow), leading to active peristalsis and relaxed sphincters, and a small, contracted gut, which enhances surgical access.

* **Endocrine system.** Nerve supply to the adrenals is blocked leading to a reduction in the release of catecholamines.

* **Genitourinary tract.** Urinary retention is a common problem with epidural anaesthesia. A severe drop in blood pressure may affect glomerular filtration in the kidney if sympathetic blockade extending high enough to cause significant vasodilatation.

Complications and Side Effects

Serious complications may occur with epidural anaesthesia. Facilities for resuscitation should always be available whenever epidural anaesthesia is performed. They include:

1. Sheering of nerve roots
2. Hypotension
3. Inadvertent high epidural block
4. Local anaesthetic toxicity
5. Total spinal
6. Urinary retention
7. Infection
8. Accidental dural puncture
9. Epidural haematoma
10. Back ache

VISUAL ANALOGUE SCORE[7]

Pain

An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. There are various scores and scales to measure pain. The commonly used in studies is the visual analogue scale.

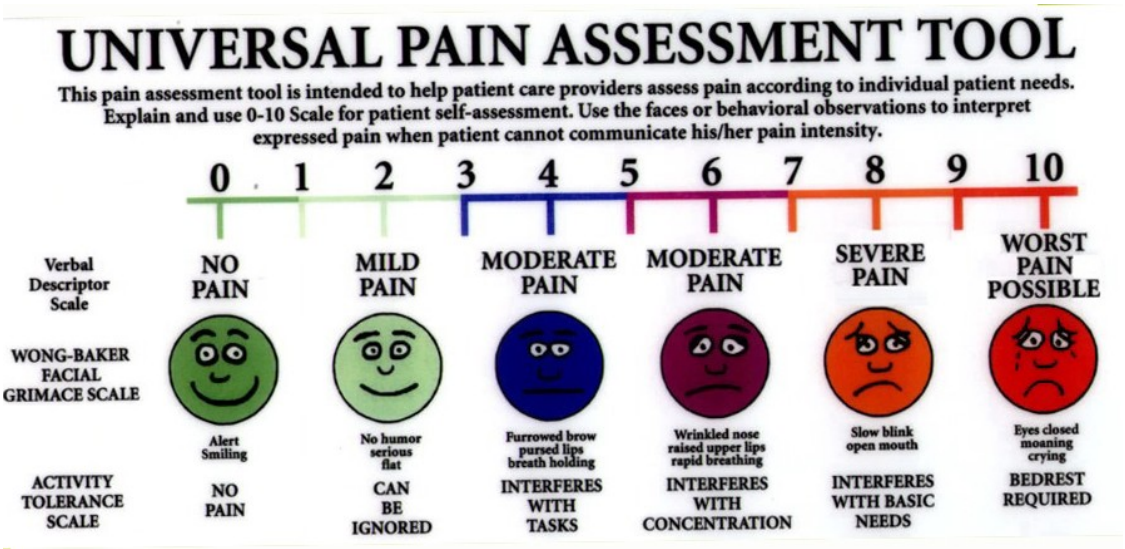
A Visual Analogue Scale (VAS) is a measurement instrument that tries to measure

a characteristic or attitude that is believed to range across a continuum of values and cannot easily be directly measured. From the patient's perspective this spectrum appears continuous. Their pain does not take discrete jumps, as a categorization of none, mild, moderate and severe

Operationally a VAS is usually a horizontal line, 100 mm in length, anchored by word descriptors at each end. The patient marks on the line the point that they feel represents their perception of their current state.

The VAS score is determined by measuring in millimeters from the left hand end of the line to the point that the patient marks.

There are many other ways in which VAS have been presented, including vertical lines and lines with extra descriptors.



REVIEW OF LITERATURE

1) *Singelyn FJ, Gouverneur JM, et.al. 1999 Nov; (J Clin Anesth, 11(7):550-4)* Postoperative analgesia after total hip arthroplasty: i.v. PCA with morphine, patient-controlled epidural analgesia, or continuous "3 in 1" block: a prospective evaluation in more than 1,300 patients .They concluded that after THA, i.v. PCA with morphine, continuous "3-in-1" block, and PCEA provided comparable pain relief. Because it induces the fewest technical problems and side effects, continuous "3-in-1" block is the preferred technique[8].

2) *Dr. Uma Srivastava Dr. Aditya Kumar Dr. Surekha Saxena, Dr. Anjum Naz Dr. Vineeta Goyal Dr. Roli Mehrotra, (Indian journal of anesthesia, 2007; 51(2):127-130)* studied **"**Lumbar Plexus Block for Post-Operative Analgesia following Hip Surgery: A Comparisonof "3 In 1" And Psoas Compartment Block" in 44 patients. It was concluded that both approaches of lumbar plexus block were effective in providing post operative analgesia after hip surgery[9].

3) *Cho CH, Choi JS, Park CH, Lee CS, Kim WT (*Chonnam Med J. *2002 Dec;38(4):418-420. Korean).* A Case of Pre and Postoperative Analgesia by Continuous 3 in 1 Nerve block in Patient with Femoral Neck Fracture. The 3-in-1 femoral nerve block is preferable to continuous epidural blockade for pre- and postoperative analgesia[10].

4) *F. J. SINGELYN (Acta Anaesth. Belg., 2006, 57, 109-112)*). After femoral shaft or neck fracture, continuous lumbar plexus block provided efficient postoperative analgesia. As it requires no patient's positioning, an anterior approach is easier to perform in such circumstances. After major lower limb surgery, continuous peripheral nerve blocks provide better analgesia than IV PCA with morphine. As efficient as epidural analgesia, they induce much less side effects or technical problems. Continuous femoral nerve sheath or fascia iliaca block is the most appropriate technique after major hip, femoral shaft, or knee surgery[11].

5) *S. Tuncer et al.,* Acute Pain*, 2003 Volume 4, Issue 4, Pages 105-108,* Patient-controlled femoral nerve analgesia versus patient-controlled intravenous analgesia for postoperative analgesia after Trochanteric fracture repair of the two PCA techniques tested in 40 patients, femoral nerve PCA with continuous infusion provides greater patient comfort both at rest and with ambulation than does IV PCA[12].

6) *François J. Singelyn, MD, PhD, Patrick E. Vanderelst, MD, and Jean-Marie A. Gouverneur, MD (Anesth Analg2001; 92:455-459),* Extended Femoral Nerve Sheath Block after Total Hip Arthroplasty: Continuous Versus Patient-Controlled Techniques in 45 patients. After total hip arthroplasty, an extended femoral nerve sheath block consisting of patient-controlled analgesia boluses (5 mL per 30 min) of 0.125% bupivacaine with clonidine 1 µg/mL and sufentanil 0.1 µg/mL provides

efficient postoperative analgesia and significantly minimizes local anesthetic consumption[13].

7) *P. Cuvillon, J. Ripart, S. Debureaux, C. Boisson, E. Veyrat, A. Mahamat, P. Bruelle, E. Viel and J.-J. Eledjam (Ann franesth reanim.2007jan; 26(1):2-9epub 2006dec*. Analgesia after hip fracture repair in elderly patients: the effect of a continuous femoral nerve block: a prospective and randomised study in 62 patients. Continuous femoral nerve block provided limited pain relief after hip fracture did not reduced side effects and induced an expensive cost[14].

8) *F.S. HARRAD; R.S.WILLIAMS (J bone joint (br) 1995; 77-b: 922-3)* Femoral Nerve Block in Extracapsular Femoral Neck Fractures. They randomized 50 patients with extra capsular fracture of femoral neck to receive a bupivacaine femoral nerve block or systemic analgesia alone. A femoral nerve block was found to be easy procedure, which significantly reduce peri operative analgesic requirements and post operative morbidity[15].

9) Capdevila X, Biboulet P, Bouregba M, *et al,* (Journal of Clinical Anesthesia, Volume 10, Issue 7, Pages 606-609). They tested the effectiveness of bilateral continuous paravascular femoral nerve blocks in a patient following bilateral femoral shaft surgery in whom other analgesic regimens were considered contraindicated or of limited effectiveness. Visual analog scale (VAS) pain scores

were recorded in the recovery room and at 4, 16, 24, 48, and 72 hours postoperatively. Sensory assessment in the distribution of the femoral, lateral cutaneous, and obturator nerves was performed to confirm the presence of sensory blockade. Evidence of sensory conduction block was present throughout the infusion. Bilateral continuous femoral paravascular nerve blocks can be used to provide effective and safe analgesia in patients requiring aggressive analgesia in which other techniques may be contraindicated[16].

10) *Anker-Møller E, Dahl JB, Spangsberg NL, Schultz P, Wernberg M. (Ugeskr Laeger. 1990 Jun 4; 152(23):1655-8.)* [Inguinal paravascular block (3-in-1 block)]. The "three-in-one block" may be employed for immediately pain relief of pain and for treatment of postoperative pain from fractures in the hip, femur and knee. Introduction of a catheter into the femoral nerve sheath is recommended to provide continuous block of the lumbar plexus for relief of postoperative pain[17].

11) *S. J. Fowler[1], J. Symons[1], S. Sabato[1] and P. S. Myles (British Journal of Anaesthesia 2008 100(2):154-164; doi:10.1093/bja/aem37).* Epidural analgesia compared with peripheral nerve blockade after major knee surgery: a systematic review and meta-analysis of randomized trials in 510 patients. PNB with a femoral nerve block provides postoperative analgesia which is comparable with that obtained with an epidural technique but with an improved side-effect profile and is less likely to cause a severe neuraxial complication[18].

12) *Rev. Bras. Anestesiol. vol. 59 no. 5 Campinas Sept ./ Oct. 2009,* Leonardo Teixeira Domingues Duarte et al. Compared the effects of epidural and perineural patient-controlled analgesia (PCA) of the lumbar plexus on functional rehabilitation of patients undergoing THR in 48 patients analgesia of epidural PCA was more effective, it was not associated with better postoperative functional rehabilitation scores[19].

12) *Stevens* RD, *Van Gessel E*, *Flory N et al*., *Anesthesiology 2000*; *93: 115*-121. 14 Lumbar plexus block reduces pain and blood loss associated with total hip arthroplasty[20].

13) *Fletcher AK, Rigby AS, Heyes FL., Ann Emerg Med. 2003 Feb; 41:227 -33.*. 3-in-1 Femoral Nerve Block Provided Fast Pain Relief for Femoral Neck Fracture. Three-in-One Femoral Nerve Block as Analgesia for Fractured Neck of Femur in the Emergency Department: A Randomized, controlled trial[21].

14) *Christopher E. Mutty, MD[1], Erik J. Jensen, MD[2], Michael A. Manka, Jr., MD[2], Mark J. Anders, MD[2] and Lawrence B. Bone, MD[2], The* Journal of *Bone and* Joint Surgery (American). *2008; 90:218-226.* Compared Femoral Nerve Block for Diaphyseal and Distal Femoral Fractures in the Emergency Department in 54 patients. The acute pain of a diaphyseal or distal femoral fracture can be significantly decreased through the use of a femoral nerve block, which can be administered safely in the hospital emergency[22].

15) Continuous but not Single-dose Femoral Nerve Sheath Block provides efficient Pain relief after Total Hip Replacement (THR).

(i) *Fournier R. et al. Can J Anaesth 45:34-8, 1998,* Boujlel, S.1; Delbos, A.2; Singelyn, F.J.1 1. Anesthesiology, Universite´ Catholique de Louvain School of Medicine - Cliniques Universitaires St Luc, Brussels, Belgium[23];

(ii) Anesthesiology, Clinique des Ce` dres, Cornebarrieu, France Postoperative pain after THR can be difficult to control. Anterior lumbar plexus blockade is efficient to treat such IV PCA with morphine. It would thus be the recommended analgesic technique after THR.

16) *Agri, 20:1,2008 Suleyman koroglu et al* studied the effects of pre operative continuous femoral 3 in 1 nerve block for THR on post operative pain relief and Tramadol consumption during patient controlled analgesia in 30 patients, it was concluded that the 3 in 1 nerve block provided effective post operative pain relief for THR reducing post operative analgesic requirements with out increase in side effects[24].

MATERIALS & METHODS

1. Sixty patients of ASA physical status 1& 2 undergoing elective ORIF (hemiarthroplasty or DHS) for NECK OF FEMUR fracture were included in the study

2. All the patients were males and belong to age group of 20-70

3. It is a randomized controlled study. The study was approved by institutional ethical committee and consent was obtained from the patients

Inclusion criteria[8]

1. Patients with neck of femur fracture alone
2. Patient ability to give consent and willingness to participate in the study
3. ASA 1-2 category
4. Men in the age group 20-70

Exclusion Criteria[1, 8]

1. Inability to give consent for language or cognitive reasons
2. Patient refusal
3. Contra indication to femoral nerve block (infection overlying the injection site or

previous femoro popliteal by pass surgery)

4. Contra indication to central neuraxial blockade (patient refusal, plate let count less than 1 Lakh)
5. Failure of Technique
6. Duration more than 2 hours

Materials[1]

1. Sterile standard anesthesia tray prepared with the following equipments
2. Sterile towels and 4×4 gauze packs
3. Three 20 ml syringe
4. Local anesthetics 0.25% bupivacaine and 2% lignocaine
5. Sterile gloves marking pen, surface electrode
6. One 2 cc 25 gauge needle for skin infiltration
7. A 5-8cm long, short bevel, insulated stimulating needle (B BRAUN contiplex d type)
8. Peripheral nerve stimulator

Methods

* Institutional approval
* Patients were advised over night fasting
* All patients were given T.RANITIDINE 150 mg and T.DIAZEPAM 5 mg P.O on the night prior to surgery and on the morning of surgery

Intra op

* All patients premedicated with Inj. Fentanyl 1µg/kg and Glycopyrolate i.m 30 mts before the procedure
* Monitors-Non invasive BP monitor, ECG, Pulse Oximeter, Urine output
* Base line parameters were recorded
* All patents assigned numbers 1-60
* Group1-all patients with odd numbers
* Group 2 –all patients with even numbers
* An 18 gauge needle was inserted in the fore arm and crystalloid infusion started.

Group 1

*. Receive a continuous femoral nerve sheath catheter kept in the femoral sheath using Winnes Inguinal Perivascular Approach around 9 am . A bolus dose of 30 ml to distend the femoral sheath to thread the catheter was given during insertion

* At 9.30 am patient receive a spinal sub Arachnoid block using 3.5 cc of 0.5% Bupivacaine.

* At 11.30 am continuous peripheral nerve block was initiated with a infusion pump at 0.125% Bupivacaine at 10 ml per hour

Group 2

* Receive a continuous epidural catheter kept in the epidural space using loss of resistance technique.

* At 9.30 am patient receive a spinal sub Arachnoid block using 3.5 cc of 0.5% Bupivacaine.

* At 11.30 am continuous epidural analgesia was initiated with a infusion pump at 0.125% Bupivacaine at 10 ml per HOUR

Post-operative care

* All the patients were shifted to ICU

* Patients monitored for pain relief with VAS scores, complication like hypotension, Bradycardia, vomiting and urinary retention.

* All patients who develop break through pain (VAS score more than 3) will be supplemented with injection Pentazocine 30mg.
* Patients developing Bradycardia were treated with Inj.atropine and patients who had hypotension will be treated with Inj.Ephedrine and I.V. fluids.
* Patients developing vomiting were treated with Inj.Ondansetron 8.0 mg and I.V. fluids.
* Patients who developed urinary retention were catheterized with Foley catheter of appropriate size.
* Statistical analysis was done with student t test and chi square test as appropriate. A P value of less than 0.05 is significant.

OBSERVATION AND RESULTS

AGE DISTRIBUTION

			GROUP		
			1	**2**	**Total**
AGE GROUP	1	Count	5	1	6
		% within GROUP	16.7%	3.3%	10.0%
	2	Count	7	5	12
		% within GROUP	23.3%	16.7%	20.0%
	3	Count	6	11	17
		% within GROUP	20.0%	36.7%	28.3%
	4	Count	8	8	16
		% within GROUP	26.7%	26.7%	26.7%
	5	Count	4	5	9
		% within GROUP	13.3%	16.7%	15.0%
	Total	Count	30	30	60
		% within GROUP	100.0%	100.0%	100.0%

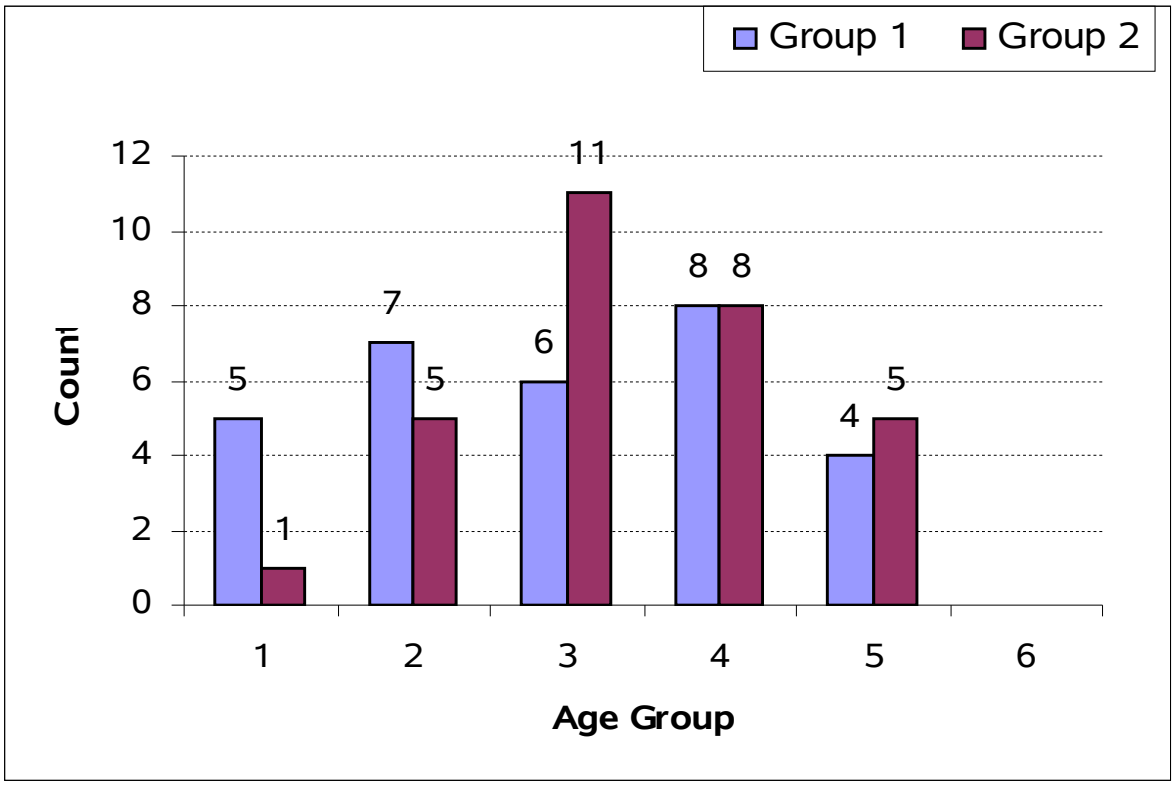
Chi-Square Tests

	Value	**df**	**Asymp. Sig.** *(2-sided)*
Pearson Chi-Square	4.582[a]	4	.333
Likelihood Ratio	4.850	4	.303
N of Valid Cases	60		

CHI SQUARE : 4.582 P= 0.333 statistically not significant.

a. 4 cells (40.0%) have expected count less than 5.

The minimum expected count is 3.00.



[Age group:

1 - (20yrs-30yrs),

2 - (30yrs-40yrs),

3 - (40yrs-50 yrs),

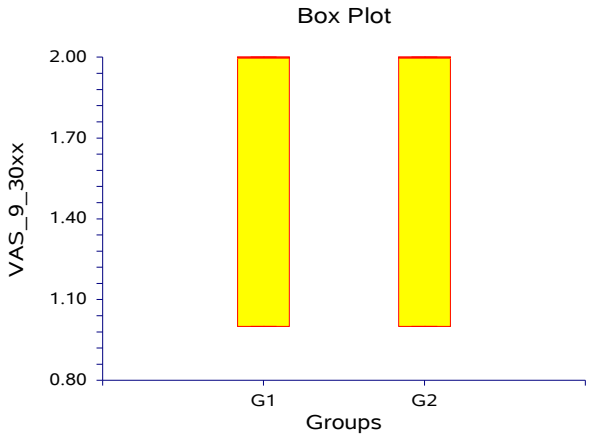
4 - (50 yrs-60 yrs),

5 - (60yrs-70 yrs)]

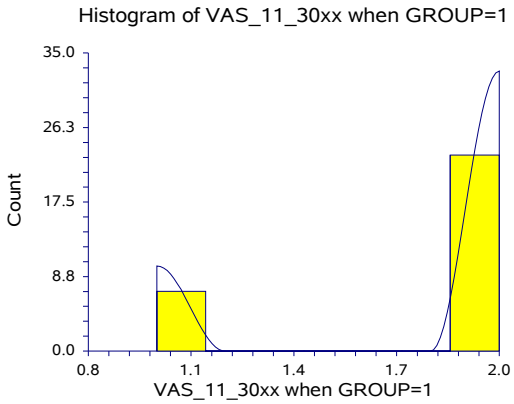
There is no significant difference between the groups

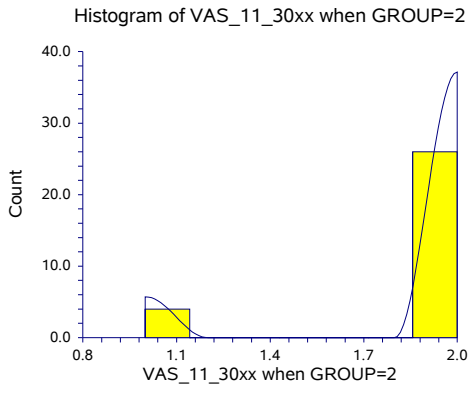
VAS SCORE ANALYSIS BETWEEN TWO GROUPS

Time	Variable	Count	Mean	SD	95% LCL	95% UCL	P value
9:30 AM	GROUP=1	30	1.733333	0.4497764	1.565384	1.901283	0.779045 ***Not Significant***
	GROUP=2	30	1.7	0.4660916	1.525959	1.874041	



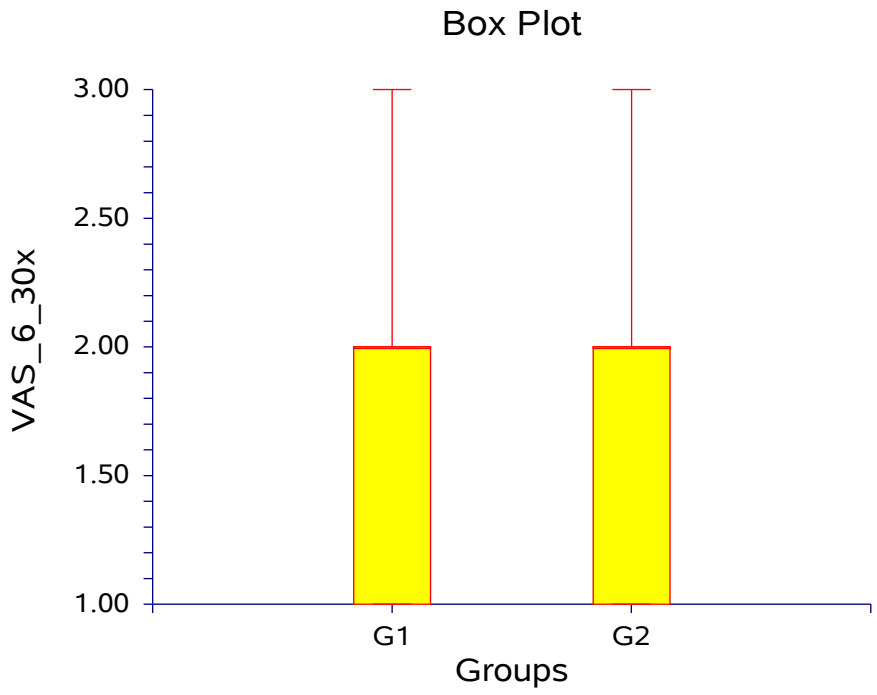
Time	Variable	Count	Mean	SD	95% LCL	95% UCL	P value
11:30am	GROUP=1	30	1.766667	0.4301831	1.606034	1.9273	0.325113 ***Not Significant***
	GROUP=2	30	1.866667	0.3457459	1.737563	1.99577	





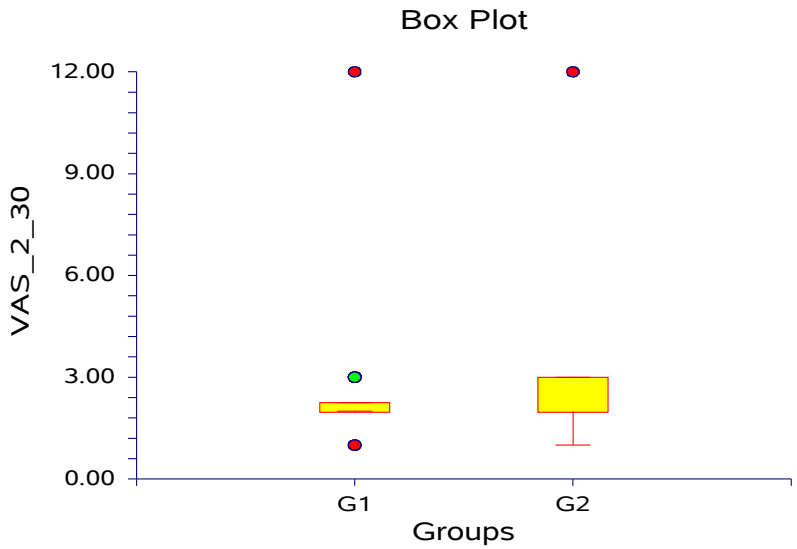
VAS SCORE ANALYSIS BETWEEN TWO GROUPS- Contd.

Time	Variable	Count	Mean	SD	95% LCL	95% UCL	P value
12:30 pm	GROUP=1	30	1.733333	0.5832923	1.515528	1.951138	1.000000 ***Not Significant***
	GROUP=2	30	1.733333	0.5832923	1.515528	1.951138	
1:30 pm	GROUP=1	30	1.633333	0.5560534	1.4257	1.840967	0.818379 ***Not Significant***
	GROUP=2	30	1.6	0.5632418	1.389682	1.810318	
2:30 pm	GROUP=1	30	1.866667	0.5713465	1.653322	2.080011	0.825178 ***Not Significant***
	GROUP=2	30	1.833333	0.5920935	1.612242	2.054425	
3:30 pm	GROUP=1	30	1.7	0.5959634	1.477464	1.922536	1.000000 ***Not Significant***
	GROUP=2	30	1.7	0.5349831	1.500234	1.899766	
4:30 pm	GROUP=1	30	1.866667	0.5713465	1.653322	2.080011	0.656387 ***Not Significant***
	GROUP=2	30	1.933333	0.5832923	1.715528	2.151138	
5:30 pm	GROUP=1	30	1.933333	0.4497764	1.765384	2.101283	0.592281 ***Not Significant***
	GROUP=2	30	1.866667	0.5074162	1.677194	2.056139	
6:30 pm	GROUP=1	30	1.8	0.5508614	1.594305	2.005695	0.478531 ***Not Significant***
	GROUP=2	30	1.7	0.5349831	1.500234	1.899766	



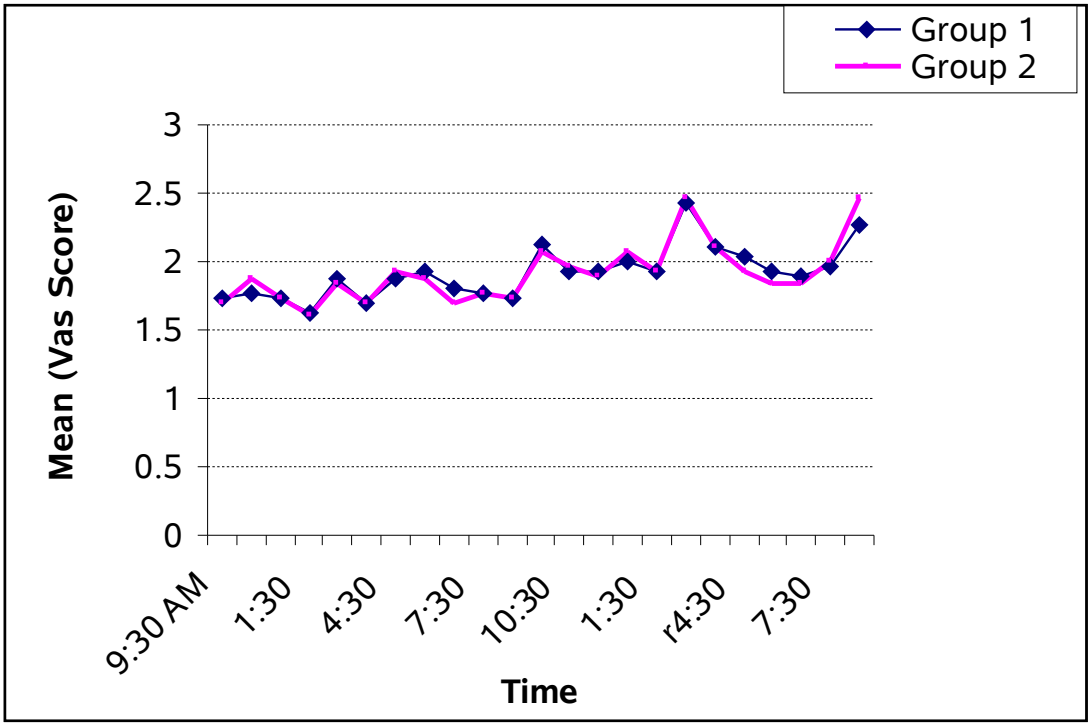
VAS SCORE ANALYSIS BETWEEN TWO GROUPS- Contd.

Time	Variable	Count	Mean	SD	95% LCL	95% UCL	P value
7:30 pm	GROUP=1	30	1.766667	0.5040069	1.578467	1.954866	1.000000 ***Not Significant***
	GROUP=2	30	1.766667	0.4301831	1.606034	1.9273	
8:30 pm	GROUP=1	30	1.733333	0.5832923	1.515528	1.951138	1.000000 ***Not Significant***
	GROUP=2	30	1.733333	0.5832923	1.515528	1.951138	
9:30 pm	GROUP=1	30	2.133333	0.5713465	1.919989	2.346678	0.617450 ***Not Significant***
	GROUP=2	30	2.066667	0.4497764	1.898717	2.234616	
10:30 pm	GROUP=1	30	1.933333	0.7396799	1.657132	2.209534	0.860076 ***Not Significant***
	GROUP=2	30	1.966667	0.7183954	1.698413	2.23492	
11:30 pm	GROUP=1	30	1.933333	0.7396799	1.657132	2.209534	0.859473 ***Not Significant***
	GROUP=2	30	1.9	0.7119667	1.634147	2.165853	
12:30 am	GROUP=1	30	2	0.7427813	1.722641	2.277359	0.728848 ***Not Significant***
	GROUP=2	30	2.066667	0.7396799	1.790466	2.342868	
1:30 am	GROUP=1	30	1.933333	0.7396799	1.657132	2.209534	1.000000 ***Not Significant***
	GROUP=2	30	1.933333	0.6914918	1.675126	2.191541	
2:30 am	GROUP=1	30	2.433333	1.887953	1.72836	3.138307	0.945991 ***Not Significant***
	GROUP=2	30	2.466667	1.907035	1.754568	3.178765	



VAS SCORE ANALYSIS BETWEEN TWO GROUPS- Contd.

Time	Variable	Count	Mean	SD	95% LCL	95% UCL	P value
3:30 am	GROUP=1	30	2.1	0.7119667	1.834147	2.365853	1.000000 ***Not Significant***
	GROUP=2	30	2.1	0.7119667	1.834147	2.365853	
4:30 am	GROUP=1	30	2.033333	0.413841	1.878803	2.187864	0.373879 ***Not Significant***
	GROUP=2	30	1.933333	0.4497764	1.765384	2.101283	
5:30 am	GROUP=1	30	1.933333	0.6396838	1.694471	2.172195	0.532224 ***Not Significant***
	GROUP=2	30	1.833333	0.5920935	1.612242	2.054425	
6:30 am	GROUP=1	30	1.9	0.4806605	1.720518	2.079482	0.585662 ***Not Significant***
	GROUP=2	30	1.833333	0.461133	1.661143	2.005523	
7:30 am	GROUP=1	30	1.966667	0.6686751	1.716979	2.216354	0.850493 ***Not Significant***
	GROUP=2	30	2	0.6948083	1.740554	2.259446	
8:30 am	GROUP=1	30	2.266667	0.868345	1.942421	2.590912	0.404422 ***Not Significant***
	GROUP=2	30	2.466667	0.9732042	2.103266	2.830067	



There is no significant difference between the two groups

BREAK THROUGH PAIN GROUP

			GROUP		
			1	**2**	**Total**
BREAK THROUGH PAIN	0	Count	2	3	5
		% within GROUP	6.7%	10.0%	8.3%
	1	Count	28	27	55
		% within GROUP	93.3%	90.0%	91.7%
	Total	Count	30	30	60
		% within GROUP	100.0%	100.0%	100.0%

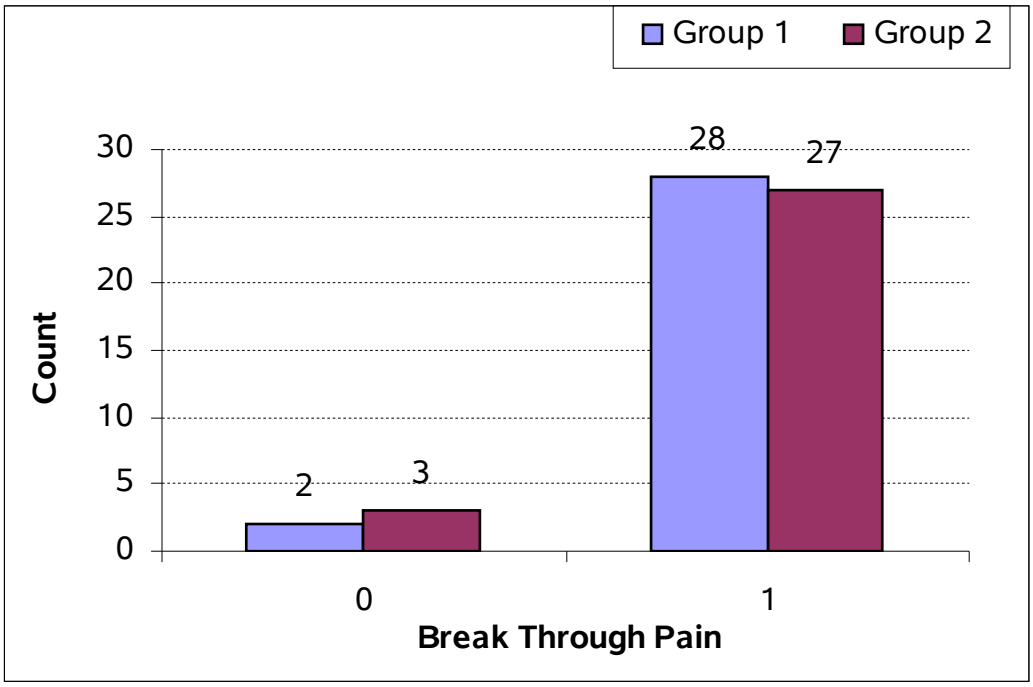
Chi-Square Tests

	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	.218[a]	1	.640
Continuity Correction[b]	.000	1	1.000
Likelihood Ratio	.220	1	.639
N of Valid Cases	60		

CHI SQUARE : .218 P= 0.640 statistically not significant.

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 2.50.

b. Computed only for a 2x2 table



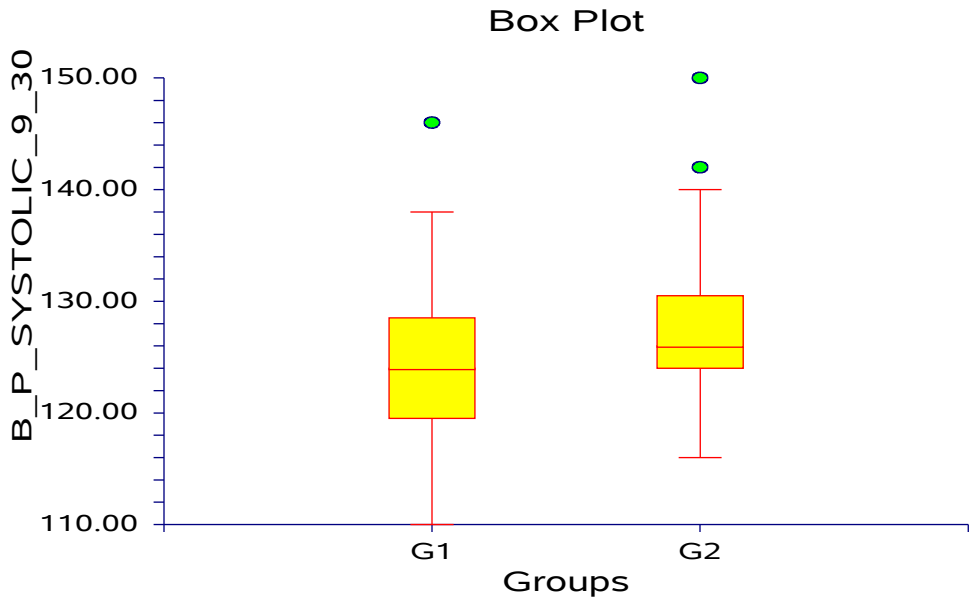
0 - Break Through Pain,

1 - No Break Through Pain

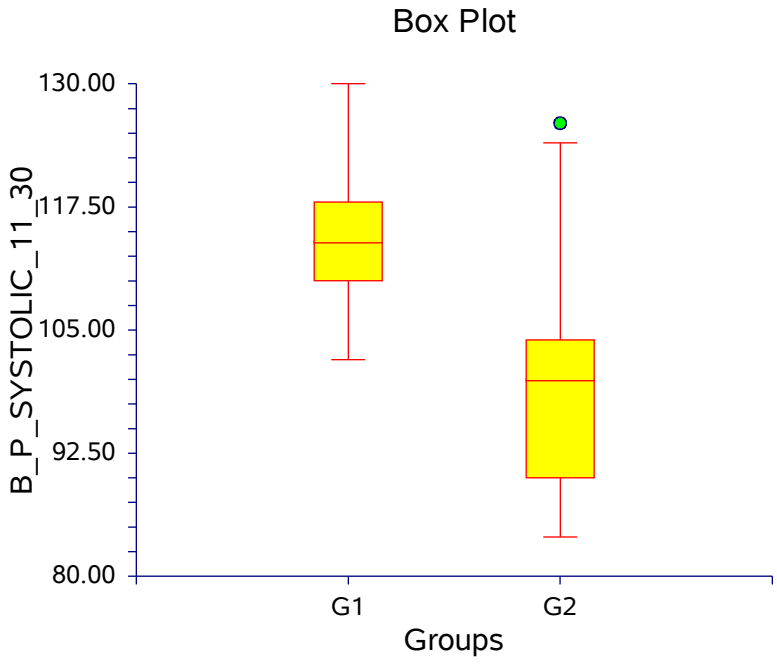
Two patients in Group 1 and 3 patients in Group 2 had break through pain.

SYSTOLIC BP ANALYSIS BETWEEN TWO GROUPS

Time	Variable	Count	Mean	SD	95% LCL	95% UCL	P value
9:30 am	GROUP=1	30	124.1333	7.99885	121.1465	127.1202	0.059325 ***Not Significant***
	GROUP=2	30	127.9333	7.286896	125.2124	130.6543	

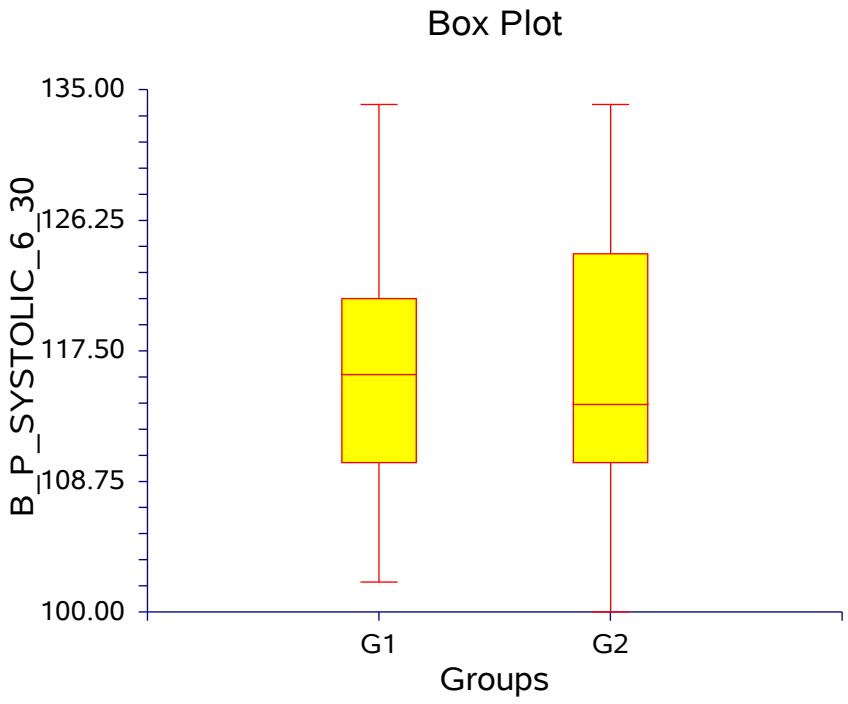


Time	Variable	Count	Mean	SD	95% LCL	95% UCL	P value
11:30 am	GROUP=1	30	114.0667	6.464403	111.6528	116.4805	0.000000 ***Significant***
	GROUP=2	30	98.2	10.44328	94.30042	102.0996	



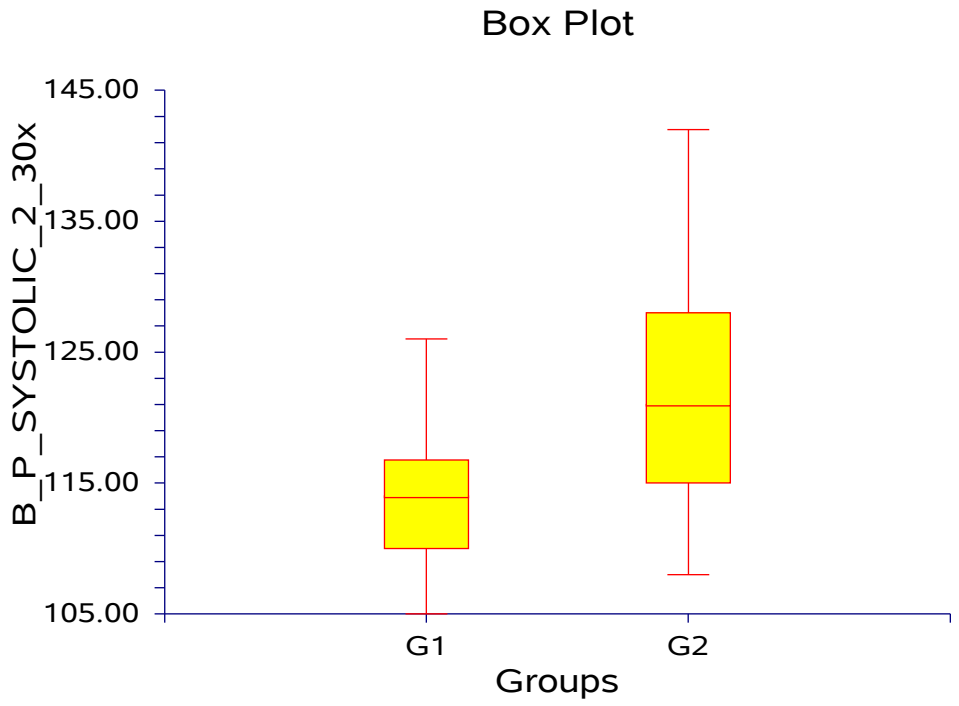
SYSTOLIC BP ANALYSIS BETWEEN TWO GROUPS – Contd.

Time	Variable	Count	Mean	SD	95% LCL	95% UCL	P value
12:30 pm	GROUP=1	30	115	8.132523	111.9633	118.0367	0.000429 ***Significant***
	GROUP=2	30	106.6667	9.11737	103.2622	110.0712	
1:30 pm	GROUP=1	30	148.5	181.0582	80.89178	216.1082	0.396215 ***Not Significant***
	GROUP=2	30	120.2	10.27014	116.3651	124.0349	
2:30 pm	GROUP=1	30	116.0333	8.984597	112.6784	119.3882	0.000045 ***Significant***
	GROUP=2	30	105.4667	9.554683	101.8989	109.0344	
3:30 pm	GROUP=1	30	117	10.07215	113.239	120.761	0.208660 ***Not Significant***
	GROUP=2	30	113.4	11.79304	108.9964	117.8036	
4:30 pm	GROUP=1	30	114.4667	9.376174	110.9655	117.9678	0.016456 ***Significant***
	GROUP=2	30	107.4	12.55224	102.7129	112.0871	
5:30 pm	GROUP=1	30	113.4667	7.682193	110.5981	116.3352	0.035719 ***Significant***
	GROUP=2	30	108.8333	8.96	105.4876	112.1791	
6:30 pm	GROUP=1	30	115.8	8.376486	112.6722	118.9278	0.724314 ***Not Significant***
	GROUP=2	30	115	9.093386	111.6045	118.3955	



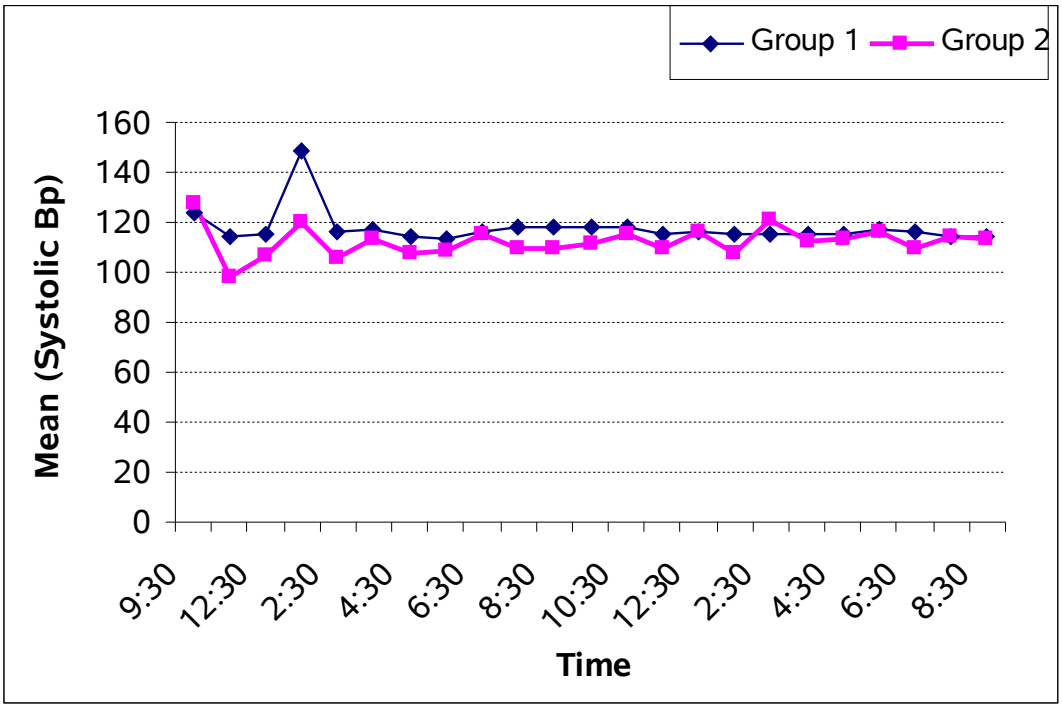
SYSTOLIC BP ANALYSIS BETWEEN TWO GROUPS – Contd.

Time	Variable	Count	Mean	SD	95% LCL	95% UCL	P value
7:30 pm	GROUP=1	30	118.2333	9.633574	114.6361	121.8306	0.000184 ***Significant***
	GROUP=2	30	109.3333	7.48485	106.5384	112.1282	
8:30 pm	GROUP=1	30	117.9333	9.996321	114.2006	121.666	0.004327 ***Significant***
	GROUP=2	30	110	10.68354	106.0107	113.9893	
9:30 pm	GROUP=1	30	118.2	9.502812	114.6516	121.7484	0.016235 ***Significant***
	GROUP=2	30	111.8	10.49598	107.8807	115.7193	
10:30 pm	GROUP=1	30	118.3667	7.667591	115.5035	121.2298	0.116277 ***Not Significant***
	GROUP=2	30	115.0667	8.349823	111.9488	118.1845	
11:30 pm	GROUP=1	30	115.3	5.614943	113.2033	117.3967	0.015360 ***Significant***
	GROUP=2	30	109.3333	11.81855	104.9202	113.7465	
12:30 pm	GROUP=1	30	115.8667	6.213075	113.5467	118.1867	0.946073 ***Not Significant***
	GROUP=2	30	116	8.773	112.7241	119.2759	
1:30 pm	GROUP=1	30	115.5	6.095504	113.2239	117.7761	0.008370 ***Significant***
	GROUP=2	30	108	13.7565	102.8632	113.1368	
2:30 pm	GROUP=1	30	114.8667	5.986959	112.6311	117.1022	0.001146 ***Significant***
	GROUP=2	30	121.2	8.180717	118.1453	124.2547	



SYSTOLIC BP ANALYSIS BETWEEN TWO GROUPS – Contd.

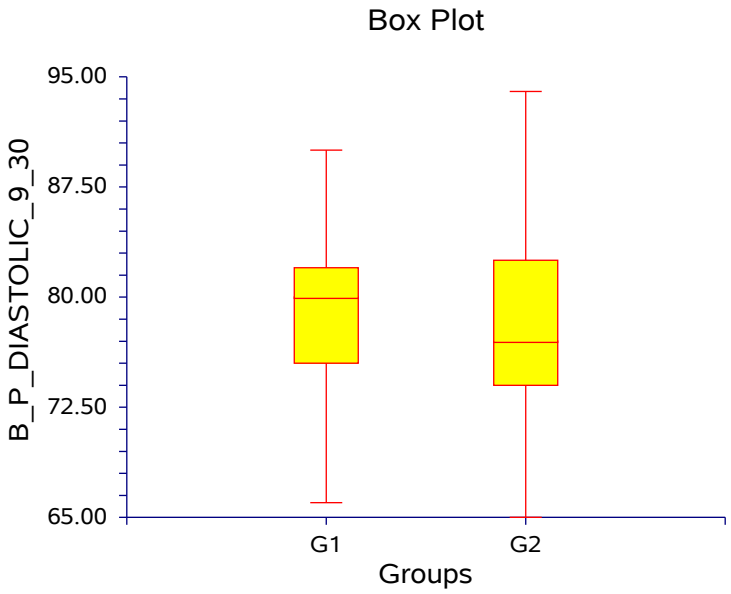
Time	Variable	Count	Mean	SD	95% LCL	95% UCL	P value
3:30 pm	GROUP=1	30	115.4333	6.420245	113.036	117.8307	0.021774 ***Significant***
	GROUP=2	30	112.2667	3.590537	110.9259	113.6074	
4:30 pm	GROUP=1	30	114.9333	7.234655	112.2319	117.6348	0.385288 ***Not Significant***
	GROUP=2	30	113.1333	8.641253	109.9066	116.36	
5:30 pm	GROUP=1	30	117	6.863195	114.4372	119.5628	0.794239 ***Not Significant***
	GROUP=2	30	116.4333	9.655026	112.8281	120.0386	
6:30 pm	GROUP=1	30	116.1333	6.532325	113.6941	118.5725	0.009634 ***Significant***
	GROUP=2	30	109.2	12.59009	104.4988	113.9012	
7:30 pm	GROUP=1	30	114.5333	6.724804	112.0222	117.0444	0.838831 ***Not Significant***
	GROUP=2	30	114.1333	8.353126	111.0142	117.2524	
8:30 pm	GROUP=1	30	114.5333	8.020376	111.5385	117.5282	0.702656 ***Not Significant***
	GROUP=2	30	113.7333	8.13224	110.6967	116.77	



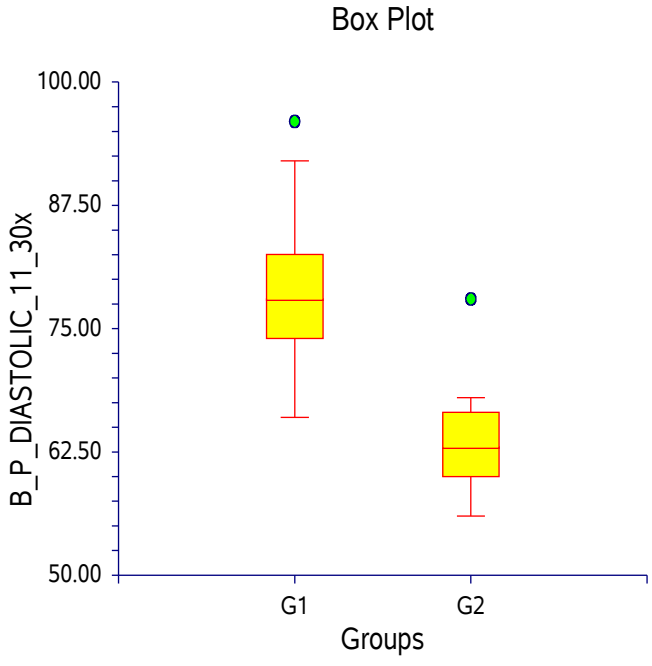
There was a significant difference in the BP during the early hours of study following which there is no much difference

DIASTOLIC BP ANALYSIS BETWEEN TWO GROUPS

Time	Variable	Count	Mean	SD	95% LCL	95% UCL	P value
9:30 am	GROUP=1	30	78.5	5.587856	76.41346	80.58654	0.621686 ***Not Significant***
	GROUP=2	30	77.76667	5.858582	75.57903	79.9543	

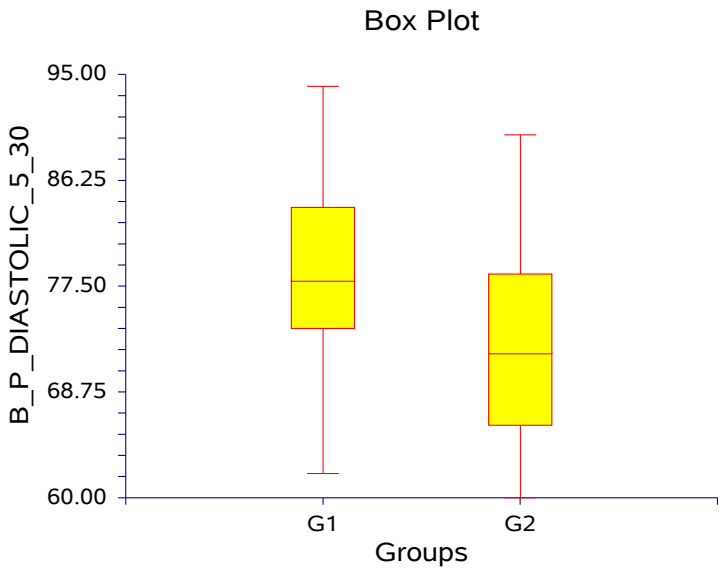


Time	Variable	Count	Mean	SD	95% LCL	95% UCL	P value
11:30 am	GROUP=1	30	78.56667	6.631603	76.09039	81.04295	0.000000 ***Significant***
	GROUP=2	30	63.2	4.505935	61.51746	64.88255	



DIASTOLIC BP ANALYSIS BETWEEN TWO GROUPS – Contd.

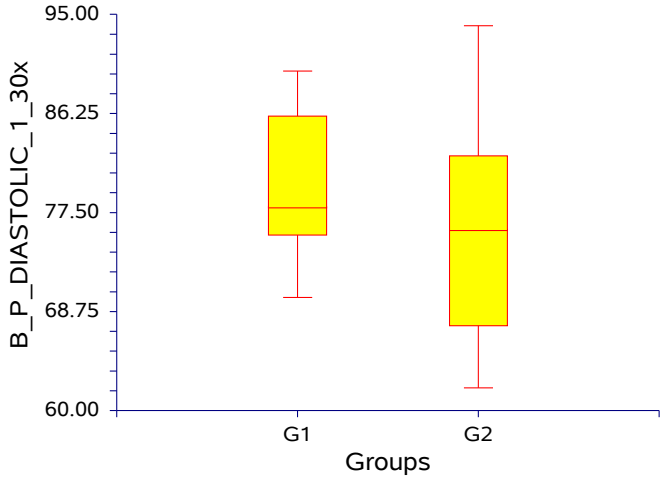
Time	Variable	Count	Mean	SD	95% LCL	95% UCL	P value
12:30 pm	GROUP=1	30	77.53333	5.399446	75.51714	79.54952	0.000076 ***Significant***
	GROUP=2	30	70.2	7.725461	67.31526	73.08473	
1:30 pm	GROUP=1	30	77.9	6.138348	75.6079	80.19209	0.000092 ***Significant***
	GROUP=2	30	70.2	7.93682	67.23634	73.16366	
2:30 pm	GROUP=1	30	77.76667	5.32841	75.77701	79.75632	0.000217 ***Significant***
	GROUP=2	30	70.86667	7.959957	67.89437	73.83897	
3:30 pm	GROUP=1	30	77.36667	5.991277	75.12949	79.60384	0.001684 ***Significant***
	GROUP=2	30	71.16666	8.387525	68.03471	74.29862	
4:30 pm	GROUP=1	30	79.96667	6.014255	77.72091	82.21243	0.000278 ***Significant***
	GROUP=2	30	72.5	8.689074	69.25545	75.74455	
5:30 pm	GROUP=1	30	79	6.741534	76.48267	81.51733	0.001907 ***Significant***
	GROUP=2	30	72.43333	8.763888	69.16084	75.70583	



DIASTOLIC BP ANALYSIS BETWEEN TWO GROUPS – Contd.

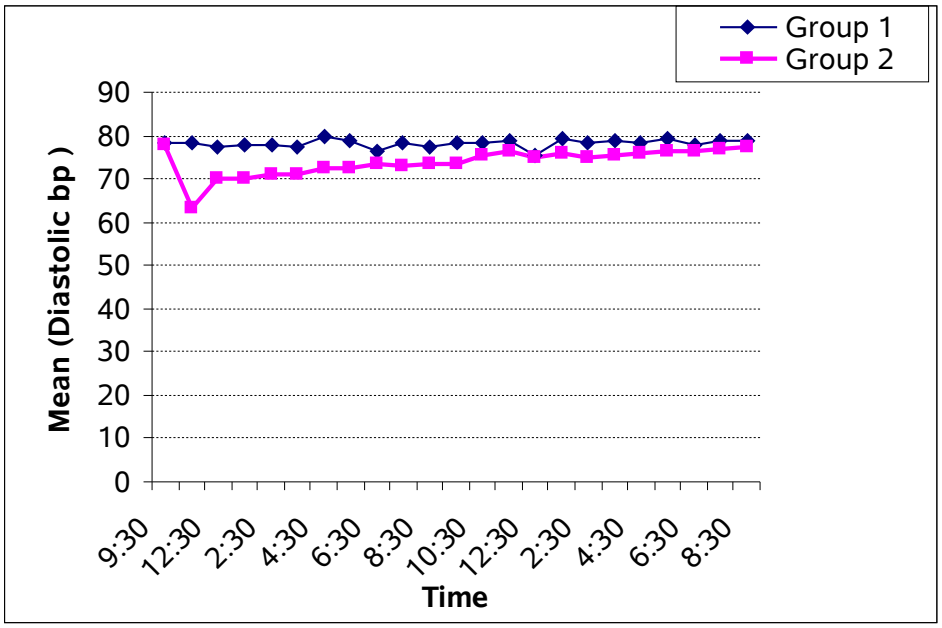
Time	Variable	Count	Mean	SD	95% LCL	95% UCL	P value
6:30 pm	GROUP=1	30	76.16666	15.16821	70.50276	81.83057	0.393201 *Not Significant*
	GROUP=2	30	73.43333	8.532628	70.2472	76.61947	
7:30 pm	GROUP=1	30	78.2	6.042379	75.94374	80.45626	0.011522 *Significant*
	GROUP=2	30	73.13333	8.752274	69.86518	76.40149	
8:30 pm	GROUP=1	30	77.56667	7.219148	74.87099	80.26234	0.080182 *Not Significant*
	GROUP=2	30	73.7	9.450962	70.17095	77.22905	
9:30 pm	GROUP=1	30	78.26667	7.588254	75.43317	81.10017	0.035735 *Significant*
	GROUP=2	30	73.36667	9.911621	69.6656	77.06773	
10:30pm	GROUP=1	30	78.46667	7.328421	75.73019	81.20314	0.141749 *Not Significant*
	GROUP=2	30	75.3	9.048338	71.9213	78.6787	
11:30pm	GROUP=1	30	78.6	6.95106	76.00443	81.19557	0.248656 *Not Significant*
	GROUP=2	30	76.16666	9.082318	72.77528	79.55806	
12:30am	GROUP=1	30	75.26667	14.35014	69.90823	80.6251	0.948388 *Not Significant*
	GROUP=2	30	75.06667	8.831501	71.76893	78.3644	
1:30 am	GROUP=1	30	79.33334	5.785436	77.17302	81.49365	0.065916 *Not Significant*
	GROUP=2	30	75.7	8.902344	72.37581	79.02419	
2:30 am	GROUP=1	30	78.4	5.288895	76.42509	80.37491	0.089888 *Not Significant*
	GROUP=2	30	75.13333	8.923944	71.80108	78.46559	

Box Plot



DIASTOLIC BP ANALYSIS BETWEEN TWO GROUPS – Contd.

Time	Variable	Count	Mean	SD	95% LCL	95% UCL	P value
3:30 am	GROUP=1	30	78.76667	5.593613	76.67798	80.85535	0.090921 *Not Significant*
	GROUP=2	30	75.3	9.523655	71.74381	78.85619	
4:30 am	GROUP=1	30	78.46667	6.044281	76.20969	80.72364	0.188517 *Not Significant*
	GROUP=2	30	76.1	7.639958	73.24719	78.9528	
5:30 am	GROUP=1	30	79.33334	6.019126	77.08575	81.58091	0.143983 *Not Significant*
	GROUP=2	30	76.3	9.465546	72.76551	79.8345	
6:30 am	GROUP=1	30	77.8	6.477548	75.38124	80.21876	0.460708 *Not Significant*
	GROUP=2	30	76.4	8.041273	73.39734	79.40266	
7:30 am	GROUP=1	30	79	5.349831	77.00234	80.99766	0.252360 *Not Significant*
	GROUP=2	30	76.96667	8.010696	73.97543	79.95791	
8:30 am	GROUP=1	30	78.66666	6.503757	76.23812	81.10017	0.035735 *Significant*
	GROUP=2	30	77.26667	7.172425	74.58844	77.06773	



There was a significant difference in the diastolic BP between the two groups based on the p value

HYPO TENSION GROUP

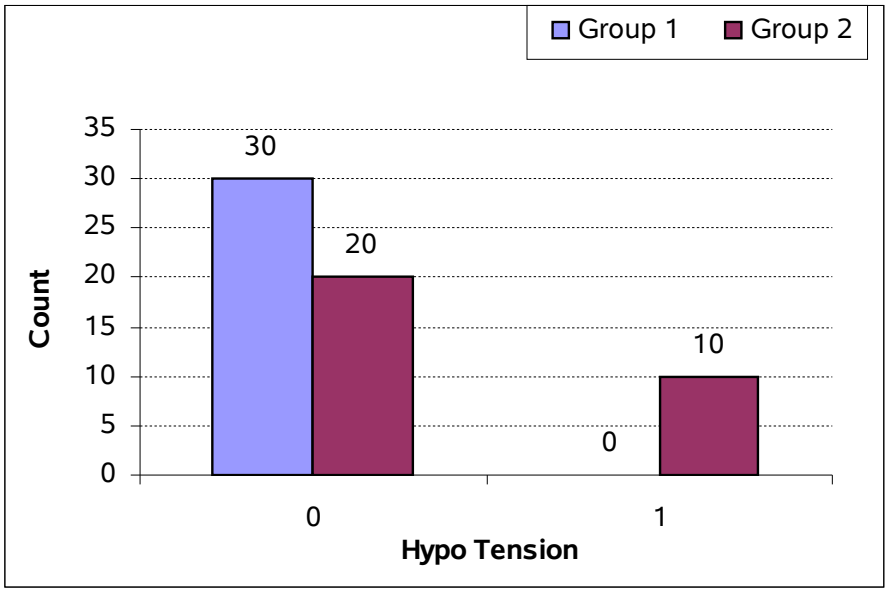
Crosstab

			GROUP		
			1	**2**	**Total**
HYPO TENSION	0	Count	30	20	50
		% within GROUP	100.0%	66.7%	83.3%
	1	Count	0	10	10
		% within GROUP	.0%	33.3%	16.7%
	Total	Count	30	30	60
		% within GROUP	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	12.000[a]	1	.001
Continuity Correction[b]	9.720	1	.002
Likelihood Ratio	15.876	1	.000
N of Valid Cases	60		

CHI SQUARE : 12.000 P= 0.001 statistically significant.

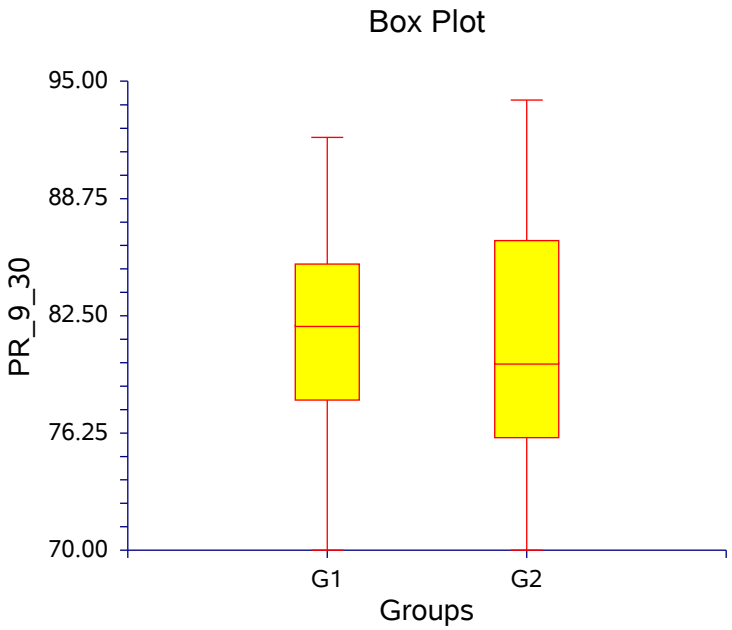


0-No hypotension, 1-Hypotension

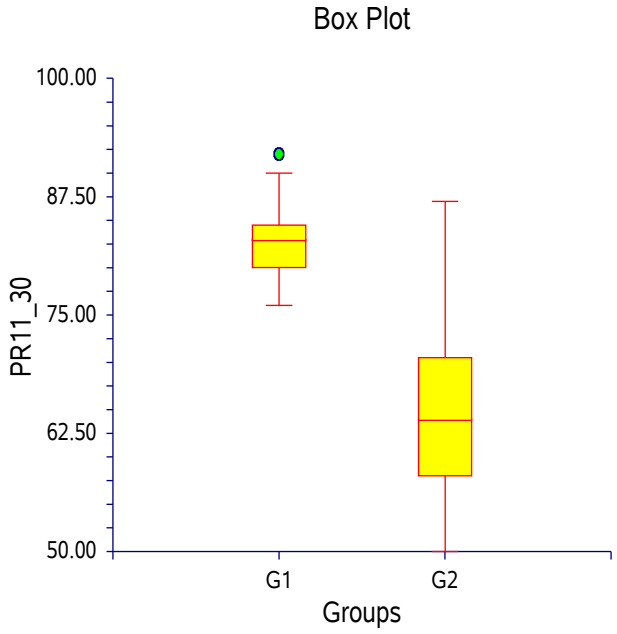
It is evident that none of the patients in group one developed hypotension where as 10 patients in group 2 developed hypotension .There was a significant increase in the incidence of hypotension in group 2.

PULSE RATE ANALYSIS BETWEEN TWO GROUPS

Time	Variable	Count	Mean	SD	95% LCL	95% UCL	P value
9:30 am	GROUP=1	30	81.83334	5.252804	79.8719	83.79476	0.654728 ***Not Significant***
	GROUP=2	30	81.13333	6.719674	78.62417	83.6425	

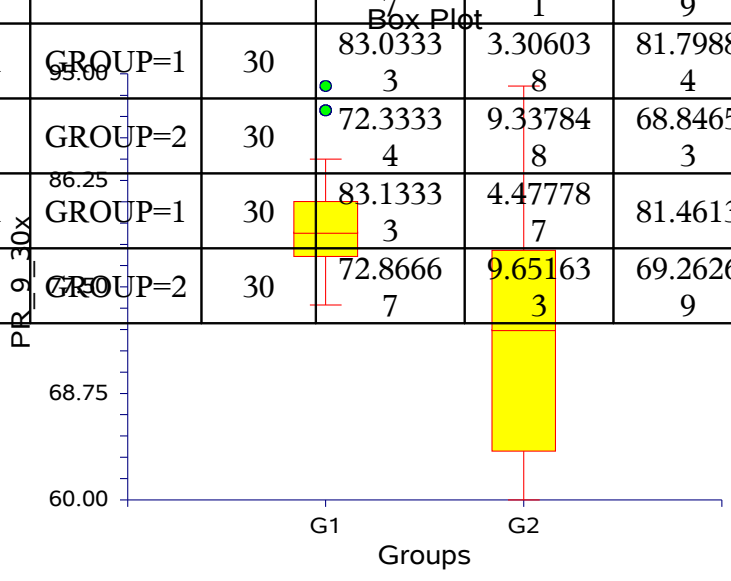


Time	Variable	Count	Mean	SD	95% LCL	95% UCL	P value
11:30am	GROUP=1	30	82.93333	4.126728	81.39239	84.47428	0.000000 ***Significant***
	GROUP=2	30	65.4	9.704602	61.77624	69.02376	



PULSE RATE ANALYSIS BETWEEN TWO GROUPS – Contd.

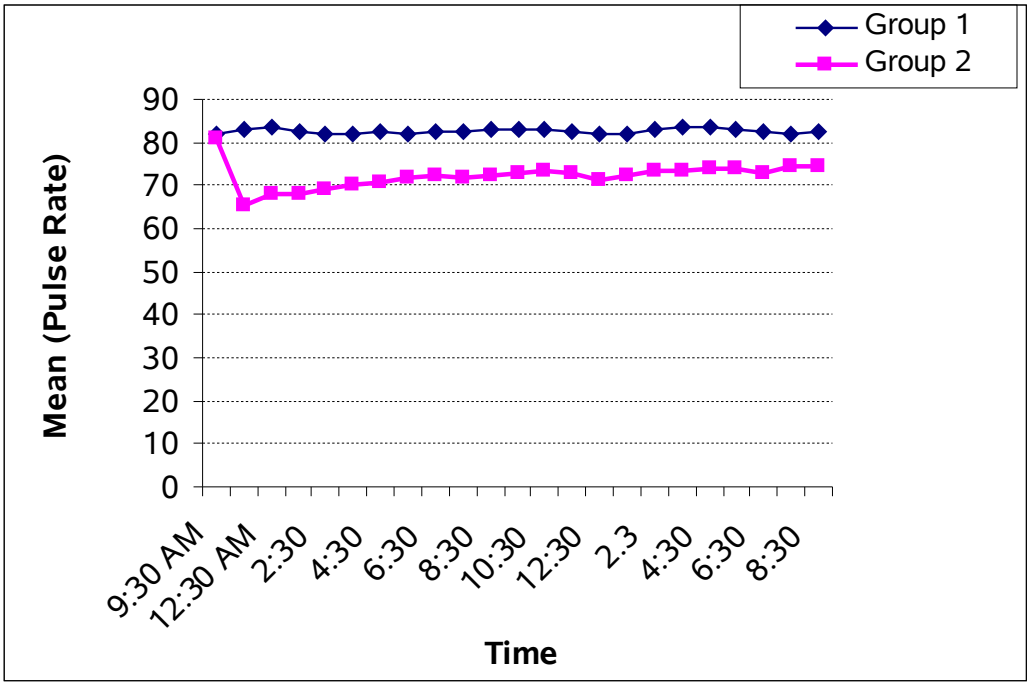
Time	Variable	Count	Mean	SD	95% LCL	95% UCL	P value
12:30 pm	GROUP=1	30	83.66666	5.175095	81.73425	85.59908	0.000000 ***Significant***
	GROUP=2	30	67.86667	6.323101	65.50558	70.22775	
1:30 pm	GROUP=1	30	82.4	4.499808	80.71974	84.08025	0.000000 ***Significant***
	GROUP=2	30	67.8	6.50411	65.37132	70.22868	
2:30 pm	GROUP=1	30	82.13333	4.576803	80.42432	83.84234	0.000000 ***Significant***
	GROUP=2	30	69.33334	7.544504	66.51617	72.1505	
3:30 pm	GROUP=1	30	82.2	3.497782	80.89391	83.5061	0.000000 ***Significant***
	GROUP=2	30	70.23333	7.546103	67.41557	73.05109	
4:30 pm	GROUP=1	30	82.26667	4.093168	80.73825	83.79508	0.000000 ***Significant***
	GROUP=2	30	70.6	8.467381	67.43822	73.76177	
5:30 pm	GROUP=1	30	82.13333	4.199617	80.56517	83.70149	0.000000 ***Significant***
	GROUP=2	30	71.86667	8.645244	68.63848	75.09486	
6:30 pm	GROUP=1	30	82.53333	4.099902	81.0024	84.06426	0.000000 ***Significant***
	GROUP=2	30	72.33334	8.599652	69.12217	75.54449	
7:30 pm	GROUP=1	30	82.66666	4.045716	81.15598	84.17736	0.000001 ***Significant***
	GROUP=2	30	71.76667	9.817941	68.10059	75.43275	
8:30 pm	GROUP=1	30	83.03333	3.306038	81.79884	84.26783	0.000000 ***Significant***
	GROUP=2	30	72.33334	9.337848	68.84653	75.82014	
9:30 pm	GROUP=1	30	83.13333	4.477787	81.4613	84.80537	0.000002 ***Significant***
	GROUP=2	30	72.86667	9.651633	69.26269	76.47064	



PULSE RATE ANALYSIS BETWEEN TWO GROUPS – Contd.

Time	Variable	Count	Mean	SD	95% LCL	95% UCL	P value
10:30 pm	GROUP=1	30	83.13333	4.191398	81.56824	84.69843	0.000000 ***Significant***
	GROUP=2	30	73.16666	8.662577	69.93201	76.40133	
11:30 pm	GROUP=1	30	82.6	4.206727	81.02918	84.17081	0.000001 ***Significant***
	GROUP=2	30	72.6	9.174929	69.17403	76.02598	
12:30 am	GROUP=1	30	81.93333	3.805018	80.51252	83.35415	0.000000 ***Significant***
	GROUP=2	30	71.13333	8.892978	67.81264	74.45403	
1:30 am	GROUP=1	30	81.9	4.138549	80.35464	83.44536	0.000000 ***Significant***
	GROUP=2	30	72.23333	7.223333	69.17658	75.29008	
2.30 am	GROUP=1	30	83.13333	3.989065	81.64379	84.62287	0.000001 ***Significant***
	GROUP=2	30	73.6	8.857492	70.29256	76.90744	
3.30 am	GROUP=1	30	83.6	3.765543	82.19392	85.00607	0.000001 ***Significant***
	GROUP=2	30	73.63333	8.999936	70.27271	76.99397	
4:30 am	GROUP=1	30	83.4	3.93569	81.93039	84.86961	0.000001 ***Significant***
	GROUP=2	30	73.8	8.965066	70.45239	77.14761	
5:30 am	GROUP=1	30	83.2	4.318365	81.58749	84.81251	0.000014 ***Significant***
	GROUP=2	30	74.06667	9.634469	70.46909	77.66424	
6:30 am	GROUP=1	30	82.6	4.239388	81.01698	84.18301	0.000008 ***Significant***
	GROUP=2	30	73.06667	9.765998	69.41998	76.71335	
7:30 am	GROUP=1	30	82.16666	4.60946	80.44547	83.88787	0.000126 ***Significant***
	GROUP=2	30	74.33334	9.367344	70.83551	77.83115	
8:30 am	GROUP=1	30	82.6	4.206727	81.02918	84.17081	0.000037 ***Significan***

	GROUP=2	30	74.4666 7	9.03149	71.0942 5	77.8390 8	*t*



There is a significant difference in the pulse rate between the two groups compared over a period of 24 hours.

BRADYCARDIA GROUP

Crosstab

			GROUP		
			1	**2**	**Total**
BRADYCARDIA	0	Count	30	20	50
		% within GROUP	100.0%	66.7%	83.3%
	1	Count	0	10	10
		% within GROUP	.0%	33.3%	16.7%
	Total	Count	30	30	60
		% within GROUP	100.0%	100.0%	100.0%

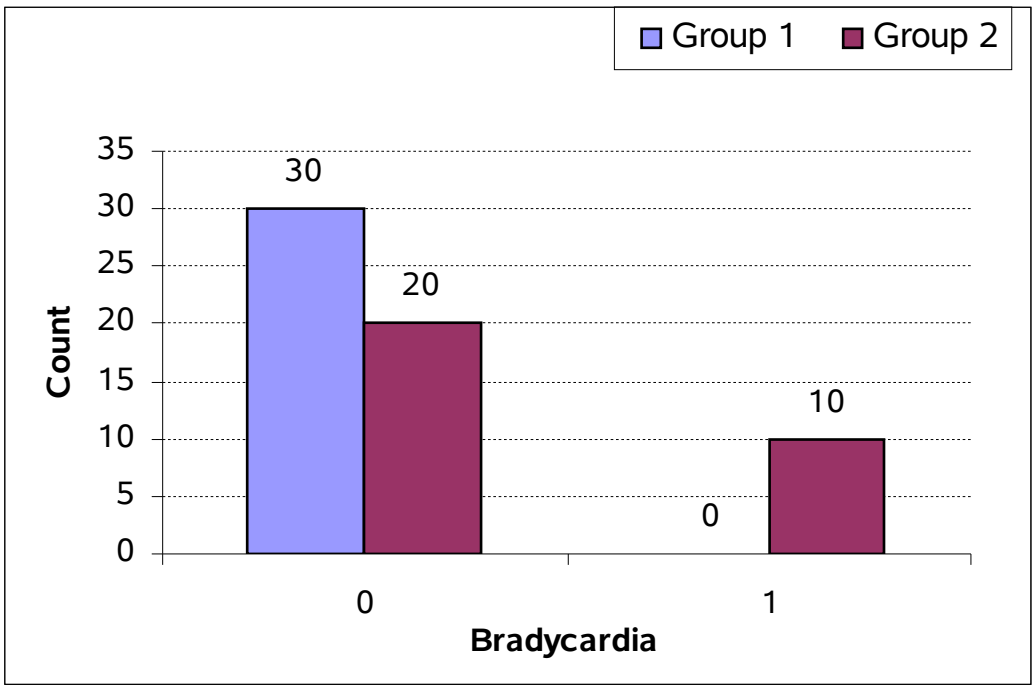
Chi-Square Tests

	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	12.000[a]	1	.001
Continuity Correction[b]	9.720	1	.002
Likelihood Ratio	15.876	1	.000
N of Valid Cases	60		

CHI SQUARE : 12.000 P= 0.001 statistically significant.

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.00.

b. Computed only for a 2x2 table



0-No Bradycardia, 1- Bradycardia

Bradycardia Occurred More Frequently In Group 2. Around ten patients in group 2 developed Bradycardia where as none of the patients in group 1 developed hypotension.

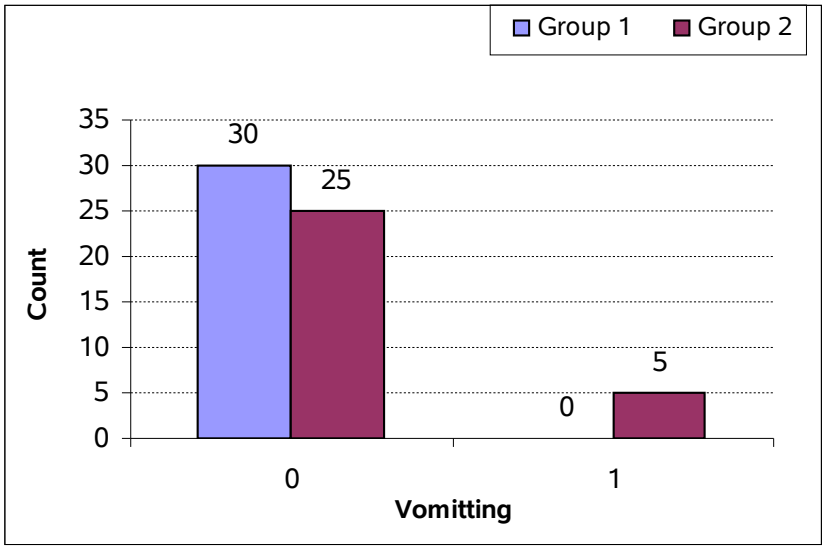
COMPARISON OF VOMITING IN GROUPS

			GROUP		
			1	**2**	**Total**
VOMITTING	0	Count	30	25	55
		% within GROUP	100.0%	80.0%	90.0%
	1	Count	0	5	5
		% within GROUP	.0%	16.7%	8.3%
	Total	Count	30	30	60
		% within GROUP	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.667[a]	2	.036
Likelihood Ratio	8.986	2	.011
N of Valid Cases	60		

CHI SQUARE : 6.667 P= 0.036 statistically significant.



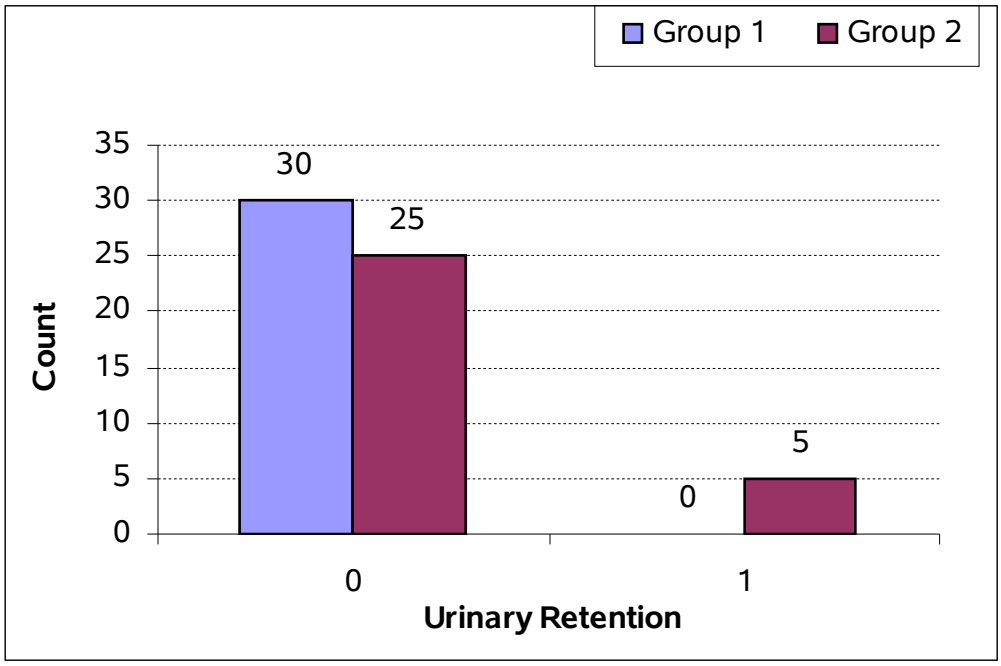
0-No Vomiting,
1- Vomiting occurred

Vomiting is significantly higher in group 2

COMPARISON OF URINARY RETENTION IN GROUPS

			GROUP		
			1	2	Total
URINARY RETENTION	0	Count	30	25	55
		% within GROUP	54.50%	45.50%	100.00%
	1	Count	0	5	5
		% within GROUP	0.00%	100.00%	100.00%
	Total	Count	30	30	60
		% within GROUP	100.0%	100.0%	100.0%

CHI SQUARE : 5.455 P = 0.01952 statistically significant.



0 - No Urinary Retention, 1- Urinary Retention

Significant difference in urinary retention between the two groups is seen.

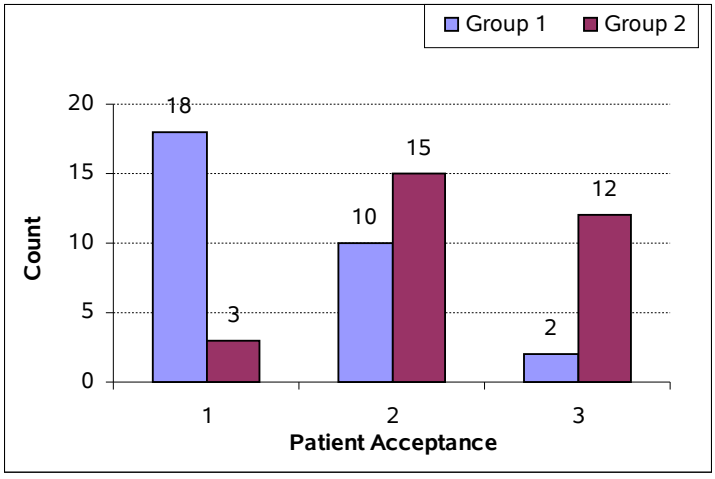
COMPARISON OF PATIENT ACCEPTANCE IN GROUPS

			GROUP		
			1	2	Total
PATIENT ACCEPTANCE	1	Count	18	3	21
		% within GROUP	60.0%	10.0%	35.0%
	2	Count	10	15	25
		% within GROUP	33.3%	46.7%	40.0%
	3	Count	2	12	14
		% within GROUP	6.7%	40.0%	23.3%
	Total	Count	30	30	60
		% within GROUP	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	19.524	3	.000
Likelihood Ratio	21.868	3	.000
N of Valid Cases	60		

CHI SQUARE : 19.524 P= 0.000 statistically significant.



1 - Very satisfying,
2 - Satisfying,
3 - Not satisfying

Patient acceptance is high with group 1as evident from the chisquare analysis.

DISSCUSSION

The aim of postoperative pain treatment is to provide subjective comfort in addition to inhibiting trauma-induced nociceptive impulses in order to blunt autonomic and somatic reflex responses to pain and subsequently to enhance restoration of function by allowing the patient to breathe, cough and move more easily[2].

Unrelieved pain after surgery is often unhealthy; fortunately, it is preventable or controllable in an overwhelming majority of cases[7].

Pain control may have a further benefit of improving clinical outcome by reducing the incidence of postoperative complications such as:

* myocardial infarction or ischemia
* risk of tachycardia and dysrhythmia
* impaired wound healing
* risk of atelectasis
* thromboembolic events
* peripheral vasoconstriction
* metabolic acidosis.

Direct injection of local analgesic drugs close to peripheral nerves, major nerve trunks or nerve roots produces analgesia by blocking conduction of afferent impulses.

Epidural analgesia is a useful technique for the relief of postoperative pain because a catheter can be used to maintain analgesia in the postoperative period."

There are numerous studies to compare peripheral nerve block with epidural analgesia for post of pain relief, the results of which were conflicting. In some of the studies, peripheral nerve block was the preferred technique whereas in some studies it is not[8, 14].

I was Impressed by the Article in Acta Analgesia by Syngelyn who did a Randomised control study in 1300 Patients comparing continuous Femoral 3-in-1 Nerve Block with Epidural for post Operative pain relief in patients undergoing total hip replacement.

The study was done in 1338 patients of ASA physical status I, II and III patients scheduled for elective unilateral total hip Arthroplasty (THA). The post operative pain relief was given for a period of 48 hours. During the study the pain scores supplemental analgesia satisfaction score and side effects like vomiting, nausea, pruritus, hypotension, urinary retention were compared between the two groups. Post operative pain relief was coparable in both the groups. In the study, continuous femoral analgesia was associated with a significantly less frequent incidence of nausea, vomiting, urinary retention and hypotension when compared with a continuous epidural analgesia. The incident of side effects was 23.5% in continuous femoral group whereas it was 71.9% with continuous epidural. The satisfaction score was significantly higher in continuous femoral group. (About 87± 14) in compared with continuous epidural group (about 81 or ± 14).

Our aim is to compare the efficacy of continuous femoral 3 in 1 nerve block to epidural analgesia for post-operative pain relief in NECK OF FEMUR fractures

In our study .all the patients were males to avoid the sexual disparity, in the pain perception based on David Sheffield, et. al[25].

It is evident from the statistics that there is no significant difference in the age distribution between the two groups.

PAIN

The surgery for fracture neck of femur includes Hemi arthroplasty and DHS. The site of skin incision is in the junction of medial and lateral thigh about 2cm from the ASIS. The cutaneous distribution of this area is covered by the femoral and lateral cutaneous nerve of the thigh. The Fasia lata and the Vastus muscles which are retracted during the procedure were supplied by the femoral nerve. A small part of the posterior acetabulam is alone supplied by the nerve to quadratus femoris.

The Femoral nerve block provided effective post operative analgesia in patents with fracture neck of femur[31], femoral shaft fracture[32], Trocantric fracture and total hip replacement[8].

In the earlier studies by Singelyn et.al., the pain relief was comparable[8] in both a groups but Cuvillon et.al., in his study showed that Continuous femoral nerve block provided limited pain relief after hip fracture did not reduced side effects and induced an

expensive cost[11].

In our study we did not notice any significant difference in the pain level between the two groups as evident in the VAS scores. How ever 2 patients in group 1 and 3 patients in group 2 developed break through pain defined as VAS scale 3 and above according to universal pain measurement tool. The pain relief was comparable through out the 24 hour period of study as evident from the p value [7].

The patients in both the groups who developed break through pain were supplemented with Inj.Pentazocine 30mg I.V.

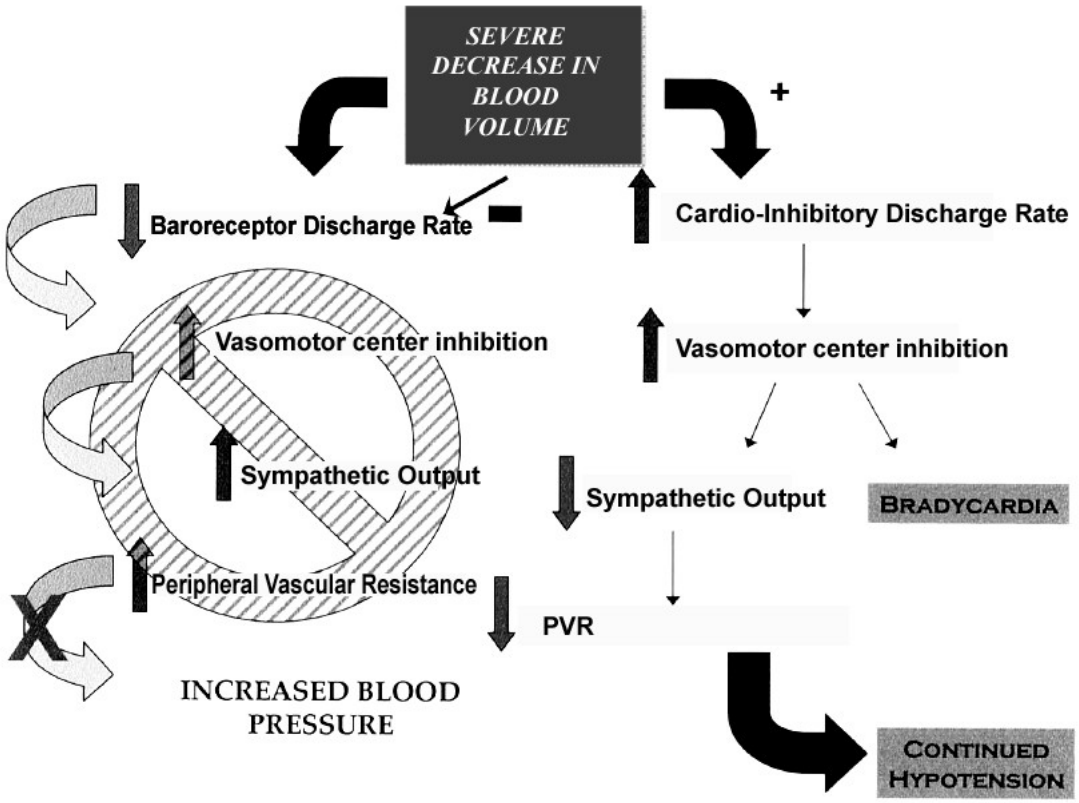
HYPOTENSION AND BRADYCARDIA[26, 28]

The sympathectomy produced by central neuraxial anesthesia induces hemodynamic changes. Hypotension and bradycardia are the most common side effects seen with sympathetic denervation. Risk factors associated with hypotension include hypovolemia, preoperative hypertension, high sensory block height, age older than 40 years, obesity, combined general and spinal anesthesia, history of hypertension, elevated BMI, high level of sensory block height, and urgency of surgery all increase the likelihood of hypotension after central neuraxial anesthesia.

The cause hypotension includes paralysis of the sympathetic vasoconstrictor fibers, loss of the milking action of peripheral muscles of lower limb and blockade of cardio accelerator fibers in higher block. The causes of bradycardia include blockade of

cardio accelerator fibers in higher block, the presence of Bezold Jarisch Reflex and Bainbridge reflex.

The Bezold–Jarisch reflex (BJR) has been implicated as a cause of bradycardia, hypotension after central neuraxial anesthesia, The BJR is a cardio-inhibitory reflex and consists of the triad of symptoms, bradycardia, hypotension and cardiovascular collapse[27].



There was a significant fall in the BP in Group 2 compared to Group 1 during most of the hours of monitoring as evident from the p value. None of the patients in Group 1 had a fall in BP.

The fall in BP was more pronounced at the beginning of the epidural analgesia as evident from the study. Although most have a fall of more than 20% in systolic BP which is the range in which the BP is maintained during anesthesia, ten patients out of 30 patients had a fall in BP of systolic less than 90 requiring ephedrine 6 mg increments, of the ten patients 3 patients had more than one episode requiring more ephedrine supplements.

Bradycardia and asystole can occur unexpectedly during neuraxial anesthesia. Moderate or severe bradycardia may occur at any time during neuraxial anesthesia, regardless of the duration of anesthesia. Low baseline heart rate increases the risk for bradycardia.

The incidence of Brady cardia is more pronounced in group 2, where as none of the patients in group 1 developed Brady cardia. The patients who developed Bradycardia were treated with Inj. Atropine 0.6mg. I.V.

VOMITING

It is a common complication associated with hypotension during anesthesia. Hypotension is a common occurrence during neuraxial anesthesia. Low blood pressure may lead to brain stem ischemia, which is thought to activate the circulatory, respiratory, and vomiting centers grouped together in the medulla. Hypotension also leads to gut ischemia and the release of emetogenic substances (*e.g.*, serotonin) from the intestines. Neuraxial anesthesia also changes the function of the gastrointestinal tract. Sympathetic

blockade by local anesthetics creates unopposed vagal action, resulting in gastrointestinal hyperactivity. Lanz et.al., in their study showed that the incidence of vomiting during epidural anesthesia was 29% in orthopedic procedures[29].

There was a significant difference in the incidence of vomiting between the two groups as evident from the p value. Five patients out of group 2 who developed hypotension had vomiting (incidence 16%). The vomiting occurred during the episode of hypotension. None of the patients in group 1 had vomiting.

URINARY RETENTION

Urinary retention is common after anesthesia and surgery, reported incidence of between 5% and 70%. In the study by Syngelyn, the incidence of urinary retention was 13% after continuous femoral nerve block. In the study by Capdevila et al., no patient developed urinary retention after continuous femoral nerve block. In our study, 5 patients belonging to Group 2 had urinary retention, requiring catheterization. None of the patients in Group I developed urinary retention[30].

PATIENT ACCEPTANCE

Patient acceptance was more with group 1 compared with group 2, and it was found to clinically significant from the p value, The most common reason found for the decreased acceptance in group was that most patients don't like to have a catheter at the back even though the pain relief was good. Also the Group 1 patients due to their early femoral nerve block could be easily positioned for spinal anesthesia than Group 2[8].

SUMMARY

There is no significant difference in the age distribution between the two groups.

In our study we did not notice any significant difference in the pain level between the two groups as evident in the VAS scores.

Only 2 patients in Group 1 and 3 patients in Group 2 developed break through pain requiring supplementation with opioids.

There was a significant fall in the BP in Group 2 compared to Group 1 during most of the hours of monitoring as evident from the p value. The difference was more in the early hours of the study.

There was a significant difference in the incidence of vomiting between the two groups as evident from the p value. The vomiting occurred during the episode of hypotension where as none of the patients in group 1 had vomiting.

The incidence of Bradycardia is more pronounced in group 2, where as none of the patients in group 1 developed brady cardia.

5 patients belonging to Group 2 have urinary retention, requiring catheterization. The difference between the groups was statistically significant.

Patient acceptance was more with group 1 compared with group 2, and the most

common reason found for the decreased acceptance in group was that most patients don’t like to have a catheter at the back even though the pain relief was good, and peripheral nerve block enabled better pain free patient positioning.

CONCLUSION

THE FEMORAL NERVE BLOCK WHEN COMPARED TO EPIDURAL ANALGESIA OFFERED COMPARABLE PAIN RELIEF WITH LOW INCIDENCE OF COMPLICATIONS, WITH INCREASED PATIENT ACCEPTANCE

BIBLIOGRAPHY

1) www.nysora.com

2) Millers anesthesia 6th edition

3) Clemente CD: Clemente Anatomy: A Regional Atlas of the Human Body, *4th ed. Lippincott Williams & Wilkins, 1997.*

4) Cunning Hams manual of practical anatomy 15th edition *volume 1 page no 172.*

5) *Vincent J. Collins,* Principles of Anesthesiology*:* General and Regional. *Anesthesia by 3rd Edition.*

6) *Robert k stoelting, Simon C.Hiller* Pharmacology and physiology in *Anesthetic practice 4th edition page 183,.*

7) Isap –Pain.Org

8) *Singelyn FJ,* Postoperative analgesia after total hip arthroplasty: i.v. PCA with morphine, patient-controlled epidural analgesia, or continuous "3-in-1" block?: a prospective evaluation by our acute pain service in more than 1,300 patients. *J Clin Anesth. 1999 Nov;11(7):550-4.*

9) *Dr. Uma et al:* Indian journal of anesthesia, Lumbar Plexus Block for Post-

Operative Analgesia Following Hip Surgery: A Comparison Of “3 In 1” And Psoas Compartment Block, Indian journal.anesth *2007; (51),(2):127-130*

10) *Cho CH, Choi JS, Park CH, Lee CS, Kim WT.,* A Case of Pre- and Postoperative Analgesia by Continuous 3-in-1 Nerve Block in Patient with Femoral Neck Fracture. *Chonnam Med J. 2002 Dec;38 (4):418-420. Korean.*

11) *F. J. SINGELYN,* Continuous peripheral nerve blocks and postoperative pain Management, *Acta Anaesth. Belg., 2006, (57, 109-112)*

12) *S Tuncer et al* Patient-controlled femoral nerve analgesia versus patient-controlled intravenous analgesia for postoperative analgesia after trochanteric fracture repair Acute Pain, 2003 *Volume 4, Issue 4, Pages 105-108*

13) *François J. Singelyn, et al,* Extended Femoral Nerve Sheath Block After Total Hip Arthroplasty: Continuous Versus Patient-Controlled Techniques. *Anesthanalg 92:455-459, 2001*

14) *P. Cuvillon et al..,* Analgesia after hip fracture repair in elderly patients: the effect of a continuous femoral nerve block: a prospective and randomized study, *ann fr anesth reanim.2007jan;26(1):2-9*

15) *F.S.HADDAD et al* femoral nerve block in extra ccapsular femoral neck fractures *J Bone. Joint Surg* [*Br*]. *1995;77-B:922-3.*

16) *Capdevila X, , et al.,* Bilateral continuous 3-in-1 nerve blockade for postoperative pain relief after bilateral femoral shaft surgery, *J. CLIN. ANESTH*, *10, 6069, 1998.*

17). *Anker-Møller E, Dahl JB, Spangsberg NL, Schultz P, Wernberg M.et.al.,* Inguinal Paravascular block (3 in 1 block) Ugeskr Laeger. *1990 Jun 4; 152(23):1655-8.)*

18) *S. J. Fowler[1], et al* Epidural analgesia compared with peripheral nerve blockade after major knee surgery. *British Journal of Anaesthesia 2008 100(2):154-164; doi:10.1093/bja/aem37*

19) Leonardo Teixeira Domingues Duarte et al. Effects of epidural and perineural patient-controlled analgesia (PCA) of the lumbar plexus on functional rehabilitation of patients undergoing THR. *Rev. Bras. Anestesiol. vol. 59 no. 5 Campinas Sept ./ Oct. 2009,*

20) *Stevens R, et al*. Lumbar plexus blockreduces pain and blood loss associated with total hip arthroplasty, *Anesthesiology 2000;93:115–21.*

21) *Fletcher AK, et al:* Three-In-One Femoral Nerve Block As Analgesia For Fractured Neck Of Femur In The Emergency Department. *Ann Emerg Med. 2003 Feb; 41:227 -33.*

22) *Christopher E. Mutty, MD[1], Erik J. Jensen, MD[2], Michael A. Manka, Jr., MD[2], Mark J. Anders, MD[2] and Lawrence B. Bone, MD[2]:* Femoral Nerve Block for Diaphyseal and Distal Femoral Fractures in the Emergency Department. *The Journal of Bone and Joint Surgery (American). 2008;90:218-226.*

23) *Fournier R, et al.* Postoperativeanalgesia with "3 in 1" femoral nerve block after prosthetichip surgery. Can J Anaesth *1998; 45: 34-38.*

24) *Kubilay Karalezli, Bayaz›t Dikmen et al* Effects Of Pre Operative Continuous Femoral 3 In 1 Nerve Block For THR On Post Operative Pain Relief And Tramadol Consumption During Patient Controlled Analgesia *AgRI, 20: 1, 2008*

25) *David Sheffield, PhD, Paula L. Biles, BA, Heather Orom, BA, William Maixner, PhD, DDS and David S. Sheps, MD, MSPH,* Race and Sex Differences in Cutaneous Pain Perception, *Psychosomatic* Medicine *62:517-523 (2000).*

26) *Jonathan B. Lesser, M.D., Kevin V. Sanborn, M.D, et.al.,* Severe Bradycardia during Spinal and Epidural Anesthesia. *Anesthesiology 2003; 99:859–66.*

27) *Jason A. Campagna M.D., Ph.D., Christopher Carter, M.D. et.al.,* Clinical Relevance of the Bezold–Jarisch Reflex. *Anesthesiology 2003; 98:1250–60*

28) *Brown DL:* Spinal, epidural, and caudal anesthesia. In Miller RD (ed): Miller's Anesthesia, *6th ed. Elsevier, 2005, pp 1653–1683.*

29) *Alain Borgeat, M.D., Georgios Ekatodramis, M.D.et.al.,* Post-operative Nausea and Vomiting in Regional Anesthesia. *Anesthesiology 2003; 98:530–47*

30) *Gabriele Baldini, M.D., Hema Bagry, M.D., F.R.C.A., F.R.C.P.C. et.al.,* Postoperative Urinary Retention, Anesthetic and Perioperative Considerations. *Anesthesiology 2009; 110:1139–57.*

31) *Finlayson BJ*, *Underhill TJ*. Et al Femoral nerve block for analgesia in fractures of the femoral neck. *Arch of Emerg Med 1988;5(3):173*

32) *R McGlone*, *K Sadhra*, *D W Hamer*, and *P E Pritty*.et al, Femoral nerve block in the initial management of femoral shaft fractures. *Arch Emerg Med. 1987 September; 4(3): 163–168.*

33) *Cuvillon P, et a:*. The continuous femoral nerve block catheter for postoperative analgesia: Bacterial colonization, infectious rate and adverse effects. *Anesth Analg 2001; 93:1045-9*

34) *Boujlel, S.1; Delbos, A.2; Singelyn, F.J.1,* Continuous but not Single-Dose Femoral Nerve Sheath Block Provides Efficient Pain Relief after Total Hip Replacement (THR). 1. Anesthesiology, Universite´ Catholique de Louvain School of Medicine - Cliniques Universitaires St Luc, Brussels, Belgium; 2. Anesthesiology, Clinique des Ce` dres, Cornebarrieu, France.

35) *Winnie AP, et al.* The inguinal paravascular technique of lumbar plexus anesthesia: the "3-in-1" block. *Anesth Analg 1973; 52:989 –96.*

36) *Johnson C.,* Continuous femoral nerve blockade for analgesia in children with femoral fractures, *Anaesth. Intensive care, 22, 281-3, 1994*.

37) http://www.baxter.com

38) *Terese T. Horlocker, MD,et al*, Analgesia for Total Hip and Knee Arthroplasty: A Multimodal Pathway Featuring Peripheral Nerve Block , *J Am Acad Orthop Surg Vol 14, No 3, March 2006, 126-135*

39) *Singelyn FJ, Ferrant T, Malisse MF, Joris D et al* Effects of intravenous patient-controlled analgesia with morphine, continuous epidural analgesia, and continuous femoral nerve sheath block on rehabilitation after unilateral total-hip arthroplasty. *Reg Anesth Pain Med. 2005 Sep-Oct;30(5):452-7.*

40) *Ganapathy S, Wasserman R, Watson JT, et al.* Modified continuous femoral three-in-one block for postoperative pain after total knee arthroplasty. *Anesth Analg 1999; 89: 1197–202.*

41) Femoral sheath. In: Agur AMR, ed. Grant's atlas of anatomy. 10th ed. Philadelphia: *Lippincott Williams & Wilkins, 1999: 314*

42) *Spencer S. Liu, MD, and Francis V. Salinas, MD et al.,* Continuous Plexus and Peripheral Nerve Blocks for Postoperative Analgesia *Anesth Analg 2003;96:263-272*

43) *Khoo ST, Brown TC et.al.* Anaesth Intensive *Care.* Femoral nerve block--the anatomical basis for a single injection technique. *Anaesth* Intensive *Care. 1983 Feb;11(1):40-2.*

A comparative study of continuous femoral 3 in 1 nerve block vs continuous epidural nerve block for post op analgesia

Date of admission		Date of Surgery	
Name	Age/ sex	Ip no	
Pre op		ASA STATUS	
Nature of injury			
Procedure Done			
BP-	HR-	CVS	RS
INCISION SITE			
POSITION		Length of incision	
Plan of anesthesia			
Time of block (SAB)			

Plan of post op pain relief	Nerve block /epidural
Length of catheter kept inside	
Amount of bolus drug injected	
Duration of surgery	

INFUSION

TIME	BP	HR	VAS SCORE	U/O	OTHER COMPLICATIONS
9:30AM					
11:30AM					
12:30AM					
1:30PM					
2:30PM					
3:30PM					
4:30PM					
5:30 PM					
6:30 PM					
7:30PM					
8:30PM					
9:30PM					
10:30 PM					
11:30 PM					
12:30PM					
1:30AM					
2:30AM					
3:30AM					
4:30 AM					
5:30 AM					
6:30 AM					
7 :30 AM					
8:30 AM					

BREAK THROUGH PAIN

Time

Alternate mode of pain relief

Remarks : patient satisfaction in own words

ABBREVIATIONS

ASIS	Anterior Superior Iliac Spine
BJR	Bezold–Jarisch reflex
BMI	Body Mass Index
DHS	Dynamic Hip Screw
NOF	Neck of Femur
PONV	Post Operative Nausea and Vomiting
PVR	Peripheral Vascular Resistance
THR	Total Hip Replacement
VAS	Visual Analogue Scale
BP	Blood Pressure
HR	Heart Rate
SAB	Sub Arachnoid Block
U/O	Urine Output

Infusor

Contiplex d peripheral nerve sheath catheter